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BLOOD GROUP FREQUENCIES IN NATIVES OF THE CENTRAL HIGHLANDS OF NEW GUINEA, AND IN THE BAININGS OF NEW BRITAIN.

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THIS paper is one of a series reporting the results of blood group genetical surveys carried out on various native populations in the Pacific area. The immediate aim of the project is the collection of data for the geographical distribution of the genes which determine the human blood group factors and certain other characteristics which can be objectively assessed, but it is hoped that analysis of the material collected may ultimately help to identify basic racial components for the present-day populations and throw some light on the problem of their origins. References and tables of results have been compiled by Simmons and Graydon (1951), and by Simmons, Graydon and Semple (1953).

Efforts have been made to incorporate as many of the more recently discovered blood groups as possible in this survey, and tests for genes in the following systems have been carried out: (i) A_1-A_2-B-O blood groups; (ii) M-N-S types; (iii) Rh types; (iv) P blood group; (v) Lewis (Le^a) blood group; (vi) the secretion of A, B or H substance in saliva; (vii) Kell (K) blood group; (viii) Duffy (Fy^a) blood group; (ix) the taste reaction to phenyl thiocarbamide.

Although no blood group data for mountain tribes of the New Guinea interior have hitherto been published, surveys of coastal natives have built up a reasonably concordant picture, the main features of which are as follows: (i) a moderate *B* gene frequency (ranging from 0·10 to 0·20); (ii) the absence of A_2; (iii) very low values for *m* (0·04 to 0·23); (iv) the presence of the *S* gene of the M-N-S system; (v) very high R^1 (0·94) and low R^2 (0·02 to 0·04) frequencies, and the probable absence of *r* (Boyd, 1939; Mourant, 1954).

However, genetical heterogeneity in the A-B-O and M-N blood groups was demonstrated in previous data for New Guinea published by the Commonwealth Serum Laboratories (Graydon and Simmons, 1945; Simmons, Graydon, Woods, Smith and Lancaster, 1946), and has again been remarked on by Walsh, Kooptzoff, Lancaster and Price (1953).

Racial Stocks in New Guinea.

According to Stirling (1943) there appear to be three fundamental racial stocks from which the present-day New Guinea populations are derived—namely, the Negritic, Papuan and Melanesian.

Predominantly Negritoid populations are distributed practically right along the great central mountain ranges of New Guinea, and, with apparently similar pygmy tribes in the upper Congo region of Africa, the Andaman Islands, Malaya and the Philippine Islands, ". . . are evidently remnants of an early widespread migration across Southern Asia, where they may have been the earliest representatives of modern man. Their characteristic physical features are their small stature, short woolly hair, round heads and broad noses".

The most widespread and numerous elements of the population are the Papuans, who occupy most of the interior of the island, the west and south coasts as far east as the Purari delta, and parts of the north coast.

> The Papuan racial stock evidently came into New Guinea at an early date following the Negrito migration from the Indonesian area. . . . The typical Papuan is dark skinned, rather short of stature and long-headed. They are inclined to be hairy and frequently have full beards. There is a tendency for the hair to recede from the forehead at a relatively early age. They seem to be related in part to the natives of Australia.
>
> The Melanesians, who apparently first reached New Guinea from the north and the Archipelagoes lying to the east, are the most recent arrivals . . . They are a tall fuzzy-haired people, darker of skin and lighter of limb than the typical Papuan. They are generally round-headed . . . Melanesian influence is strongest along the north and north-east coast region and on the south-east coast of British New Guinea.

Stirling also states that the numerous populations in the vicinity of Mount Hagen belong to a group of mountain tribes of mixed Negrito-Papuan stock, and the populations dealt with in the present survey are presumably in this category.

Birdsell (1948) interprets the New Guinea peoples in terms of four major racial components—namely (i) Negritic, (ii) Murrayian, (iii) Carpentarian, and (iv) Mongoloid.

Birdsell considers that Negritic elements are dominant in New Guinea and the Melanesian islands and represent the earliest migration into this area, presumably under pressure from later evolved races in Asia. They reached Australia, but here their influence is clearly minor except in marginal populations (for example, the extinct Tasmanians, and the Barrineans near Cairns).

Birdsell's Murrayian denotes an ancient basic white or Caucasoid element, closely allied to the present-day Ainu of Japan, and present in many refuge areas throughout Melanesia. These people are light-skinned, large-headed and faced, short and stocky in build, with excessive body and facial hair and generally "white" morphology. The aborigines of south-eastern Australia were regarded by him as comparatively unmixed Murrayian.

The Carpentarian is a tall linear, dark-skinned element with affinities to the primitive Vedda of Ceylon and Munda of India. This element is dominant in northern Australia, and is basic in the numerous dark-skinned races of India.

In the high central plateau of New Guinea, Birdsell considers that the populations are simple combinations of Negritic and Murrayian elements with the former always dominant. A similar combination occurs in the Bainings of New Britain, while in northern New Caledonia these two elements are present, but with the Murrayian dominant. The tribes of the northern and southern coastal regions of New Guinea contain the Carpentarian element, but always much mixed with the preceding two. Mongoloid influences in New Guinea refer to Polynesian, Indonesian and Malayan contacts and are present in most Melanesian-speaking tribes.

The populations of the present survey appear, then, to be of considerable importance in the attempt to ascribe characteristic blood gene frequency pictures to these hypothetical basic components, particularly as they offer in addition the advantages of large numbers and a substantial degree of isolation from recent foreign admixture.

The area of eastern New Guinea formerly known as the Central Highlands and now divided for administrative purposes into Eastern and Western Highlands Districts, has become known to Europeans only in the last twenty years, owing to the great mountain ranges which cut it off from the earlier explored areas to the east and north. It consists mainly of mountainous country 4000 to 6000 feet above sea level in the large river valleys, with peaks rising to over 15,000 feet, extending roughly from the Ramu watershed in the east to Wabag in the west and the Papuan border in the south. High mountain barriers of the Chimbu Divide and the Mount Hagen ranges determine three natural geographical divisions—eastern, central and western. The relatively flat open valleys and the lower slopes of the ranges support considerable native populations, estimated at well over 300,000, which is a very high density for New Guinea, the total estimated population of which is only some 2,000,000.

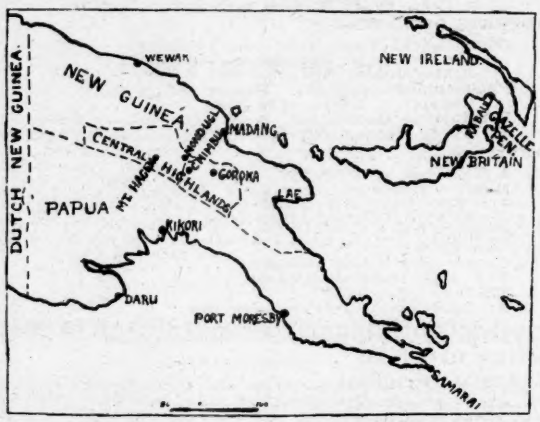

FIGURE I.

The samples examined in this survey were obtained from the populations around Chimbu, Nondugl and Mount Hagen, all of which lie in the Wahgi valley to the west of the Chimbu Divide, and Goroka, in the Asaro valley to the east of it. While these and other highland populations possess many physical and social characteristics in common, even the most superficial observation discloses considerable diversification from district to district. However, as no detailed physical anthropology has as yet been published on this area, it would be difficult to pursue this interesting aspect here. The following notes on the populations of the Chimbu district, which have been compiled by one of us (G.R.) from personal observation and from material supplied by courtesy of members of the Department of District Services and Native Affairs, are hence not completely applicable to other groups.

The average height of the males is approximately five feet four inches, and only exceptional men stand six feet. The average weight is about 130 pounds. The muscles are generally well developed, particularly those of the calves and thighs. The shoulders are broad and square, the hips narrow and the chest rounded, with well-developed pectoral muscles. The males are lean and have very little subcutaneous fat deposit. The skin is firm, of a dark brown colour, and with very little body hair, such hair as there is being very short, black and curly. Head hair is quite long, black and bunched into small tight curls. The eyes are dark brown to black, the nose is flat and broad, the lips are thick. The forehead is very high, as are the cheek-bones, and the frontal ridges over the eyes are not prominent. The sexual organs are very small, and the incidence of phimosis or paraphimosis appears to be remarkably high. The feet are extremely splayed out, frequently flat, and the toes are very wide, a large degree of muscular control being apparently retained over each individual toe.

The females are about four inches shorter than the males on the average, and have smaller bone structure and less developed muscles. They also differ in having greater deposits of subcutaneous fat, greatly protruding abdomens being very characteristic of both women and younger children.

A remarkable feature of the highlands tribes is the large number of languages and dialects spoken, changes in many areas being observed every few miles. Capell (1948-1949) states that all the languages are Papuan, that is to say non-Austronesian, and fall into several groups "obviously conditioned by the geographical peculiarities of the country, but not entirely so". There are four main language groups, roughly corresponding to the Kainantu, Bena-Bena, Chimbu and Mount Hagen districts. The sharpest line of demarkation is at the Chimbu Divide, which separates the Wahgi and Upper Purari waters, the Chimbu and Hagen languages being very different in phonetic structure, grammar and vocabulary from those spoken in the east. Melanesian languages extend as far west as the head of the Markham valley.

The Bainings of New Britain.

The Bainings or Kaulongs are a race of primitive natives found in the interior of the Gazelle Peninsula of north-eastern New Britain. Apparently remnants of a population once widespread, they were driven into this refuge area on the arrival from elsewhere of the more highly developed Papuo-Melanesian populations such as the Tolais, who now inhabit the vicinity of Rabaul. There has been a good deal of intermixture of the two groups, nowadays fostered by the Administration; but there are still several Baining tribes which are little affected by Tolai influence.

Physically the Bainings are quite distinct from the coastal peoples, being rather shorter and more heavily built, with flat broad noses, prominent supraorbital ridges and forehead hair retreating as they approach middle age. Their cultural development is very low. They are still partially nomadic, with exceedingly primitive housing structures and no definite village organization.

Some anthropologists consider that they have relationships with the interior northern New Caledonians and the extinct Tasmanians, and Birdsell, as has been mentioned above, groups them with the highland populations of Central New Guinea as a simple Negritic-Murrayian complex.

Materials and Methods.

Blood and saliva samples were collected at four centres in the New Guinea highlands, and blood samples only at one centre in New Britain at various times during 1950 and 1951. The subjects were all full-blooded natives, nearly all adult, and some trouble was taken to exclude near relatives. The samples collected at Chimbu and Nondugl were almost exclusively from males, most females refusing, apparently for superstitious reasons; but in the Goroka, Mount Hagen and Baining series, females were equally represented.

The methods of collection were the usual ones adopted in these surveys, full details of which may be found in an earlier paper (Simmons, Graydon, Semple and Taylor, 1951). In most cases the samples arrived in Melbourne within a week of collection, but some lots were delayed longer in transit, the maximum delay being seventeen days in the case of the Nondugl series. The majority of the blood samples were in good condition on arrival, although a rather larger number than usual were found to be hæmolysed, owing no doubt to unavoidable contamination under the difficult field conditions. Early blood samples were also collected from the ear lobe, which in these natives is particularly greasy and dirty, and much more difficult to cleanse than fingertips which were subsequently used. The saliva samples were almost without exception satisfactory.

Tests for the A-B-O, M-N-S, Rh, Le^a and P blood types were carried out by the slide technique as previously described (Simmons *et alii*, 1951), agglutinating sera of the appropriate specificity and, whenever possible, of maximal potency being used. The limited "Duffy" and "Kell" tests were performed with the use of sera of the "incomplete" or "blocking" type, sensitization being detected by the antiglobulin technique, while the methods of performing the salivary secretion tests are described in the paper of Simmons, Semple and Graydon (1951).

Results and Discussion.

A-B-O Groups.

Table I shows the A-B-O blood groups, percentages and gene frequencies found in a total of 485 Central Highlands people and 77 Bainings.

The moderate frequency of the *B* gene found in all previous New Guinea investigations is again evident in these groups. However, striking features are the significant differences between the frequencies of both *A* and *B* for Goroka and the remarkably constant figures for Chimbu, Nondugl and Mount Hagen. The Goroka *B* frequency (0·102) is similar to those previously found in most groups of coastal natives in New Guinea and indeed all over Melanesia (0·09 to 0·13), while the higher *B* frequency (0·179) in the Chimbu-Nondugl-Mount Hagen group is like that of only two other groups so far tested in New Guinea—namely, "Papuans" in the Daru-Kikori area (Simmons *et alii*, 1946: $B = 0{\cdot}196$) and the Papuan-speaking group of Walsh *et alii* (1953)—$B = 0{\cdot}178$. (See Table IV.)

As is constantly found in populations of the Pacific region, all the 171 New Guinea and 39 Baining samples of groups A and AB were of subgroups A_1 and A_1B respectively.

M-N-S Types.

Percentages and gene frequencies for the M-N-S blood groups are given in Table II.

All the figures for the *m* gene are exceedingly low, and it is possible that in the Bainings both *m* and *S* are altogether absent. Frequencies of this low order for *m* have been hitherto found in the Daru-Kikori Papuans ($m = 0{\cdot}039$) mentioned above, in Walsh's Papuan-speaking group ($m = 0{\cdot}087$), and in pygmies of the Wissellakes in Dutch New Guinea ($m = 0{\cdot}102$) (Semple, Graydon, Simmons and Franken, in preparation). Other Melanesian *m* frequencies range from 0·20 to 0·33, and those for Australian aborigines, New Caledonians and Micronesians also lie in this range. Again the Goroka frequencies for both *m* and *S* are significantly different from those for Chimbu, Nondugl and Mount Hagen, which do not differ much among themselves.

There is no direct evidence for the existence of the *mS* gene in the present populations, because of the absence of type M. However, the distribution of S in type N suggests that not all the S-positives found in type MN are due to the gene *nS*. Calculation shows that had all the S-positives in type MN been due to *nS*, we should have expected four S-positives instead of the seven actually found. The difference is small, but suggests a frequency of about 10% *mS* among the *m* genes for the whole Central Highlands series. In Table II frequencies are given for genes *ms* and *mS* calculated according to the method of Graydon, Simmons, Semple, Clapham, Wallace and Harrisson (1952). The only other *S* figures for New Guinea, those of Sanger (1950), Sanger, Walsh and Kay (1951), and Walsh, Kooptzoff, Lancaster and Price (1953), are in close agreement with those of the present survey as regards total *S* frequency, and the figures from all these surveys have now been shown to indicate that, like other populations of the Pacific area so far tested, and in contrast to most European and African populations, the New Guinea people have a greater proportion of *n* than *m* genes associated with *S*.

Rh Types.

Table III shows the percentages of the Rh types and gene frequencies calculated therefrom for the 485 New Guinea and 77 Baining samples tested with anti-Rh$_o$, anti-rh′, anti-rh″ and anti-hr′ sera. All the samples were Rh$_o$ positive.

It is necessary only to assume the presence of three genes of the Rh system—namely, R^1, R^2 and R^o—to account

TABLE I.

A-B-O Blood Groups and Gene Frequencies.

Place of Collection.	Number Tested.	Number of Tribes.	Number and Percentage of Groups.				Gene Frequencies.		
			O.	A_1.	B.	A_1B.	*A.*	*B.*	*O.*
New Guinea Central Highlands.									
Chimbu	120	25	44 (36·7%)	36 (30·0%)	33 (27·5%)	7 (5·8%)	0·200	0·185	0·615
Nondugl	79	2	30 (38·0%)	24 (30·0%)	19 (24·0%)	6 (8·0%)	0·212	0·173	0·615
Mount Hagen	163	52	62 (38·0%)	48 (29·4%)	41 (25·2%)	12 (7·4%)	0·205	0·178	0·617
Total Chimbu-Nondugl-Mount Hagen ..	362	79	136 (37·6%)	108 (29·8%)	93 (25·7%)	25 (6·9%)	0·205	0·179	0·616
Goroka	123	6	67 (54·5%)	32 (26·0%)	18 (14·6%)	6 (4·9%)	0·168	0·102	0·729
Total	485	85	203 (41·9%)	140 (28·9%)	111 (22·9%)	31 (6·4%)	0·195	0·159	0·646
Bainings—New Britain.									
Malasaet Village	77	1	16 (21·0%)	27 (35·0%)	22 (29·0%)	12 (16·0%)	0·297	0·252	0·451

TABLE II.

M-N Types, S Distribution and Gene Frequencies.

Place of Collection.	Number Tested.	Number and Percentage of Types.			Gene Frequencies.		Proportion of Samples S-Positive.	Distribution of S-Positive Cells.		M-N-S Gene Frequencies.[1]			
		M.	MN.	N.	*m.*	*n.*		MN.	N.	*ms.*	*mS.*	*ns.*	*nS.*
New Guinea Central Highlands.													
Chimbu	120	0	4 (3·3%)	116 (96·7%)	0·017	0·983	15/64 (23·0%)	2/4	13/60 (22·0%)	0·027	0·004	0·848	0·121
Nondugl	79	0	3 (4·0%)	76 (96·0%)	0·019	0·981	19/72 (26·0%)	1/3	18/69 (26·0%)	0·018	0·003	0·840	0·139
Mount Hagen ..	166	0	8 (4·8%)	158 (95·2%)	0·024	0·976	32/99 (32·0%)	2/7	30/92 (33·0%)	0·024	0·007	0·790	0·170
Total Chimbu-Nondugl-Mount Hagen	365	0	15 (4·1%)	350 (95·9%)	0·021	0·979	66/235 (28·1%)	5/14 (36·0%)	61/221 (27·6%)	0·025	0·005	0·823	0·147
Goroka	123	0	20 (16·3%)	103 (83·7%)	0·081	0·919	15/123 (12·2%)	2/20	13/103 (12·6%)	0·076	0·005	0·861	0·058
Total ..	488	0	35 (7·2%)	453 (92·8%)	0·036	0·964	81/358 (22·6%)	7/34 (21·0%)	74/324 (22·8%)	0·042	0·005	0·838	0·115
Bainings—New Britain.													
Malasaet Village ..	77	0	0	77	0	1·000	0/77	0/0	0/77	0	0	1·000	0

[1] The M-N-S gene frequencies were calculated according to the method published by Graydon *et alii* (1952), suitably modified to be applicable to series in which no M occurs. The value $ms+mS$ does not always equal the value for *m* given in these tables, since in most groups the numbers tested with anti-S serum were less than those tested with anti-M and anti-N.

for the results obtained. Since all but five of the samples were most probably of phenotypes Rh_1Rh_2, Rh_1Rh_0, or Rh_1Rh_z, it is possible that a low percentage of genes r′ or r″ may be present, but impossible to detect without the use of anti-Hr_0 and anti-hr″ sera. As in previous surveys and for the same reasons, the assumption of the gene R^o is made in preference to that of *r* (see Simmons, Graydon and Avias, 1949). The gene R^z was not detected in this series, although it was found in the previous New Guinea survey conducted by workers from these laboratories (Simmons *et alii*, 1946).

Once again the Goroka frequencies stand somewhat apart from those of Chimbu, Nondugl and Mount Hagen, which exhibit the very high R^1, low R^2 and R^o frequencies characteristic of populations all over Melanesia, Micronesia,

TABLE III.

The Rh Types and Gene Frequencies.

Place of Collection.	Number Tested.	Number and Percentage of Types.				Gene Frequencies.		
		Rh_1Rh_1.	Rh_1Rh_2.	Rh_1Rh_3.	Rh_2.	R^1.	R^2.	R^0.
New Guinea Central Highlands.								
Chimbu	120	98 (81·7%)	4 (3·3%)	17 (14·2%)	1 (0·8%)	0·904	0·078	0·018
Nondugl	78	61 (78·0%)	1 (1·0%)	15 (19·0%)	1 (1·0%)	0·884	0·109	0·007
Mount Hagen	164	149 (90·9%)	4 (2·4%)	11 (6·7%)	0	0·954	0·034	0·012
Total Chimbu-Nondugl-Mount Hagen	362	308 (85·1%)	9 (2·5%)	43 (11·9%)	2 (0·6%)	0·923	0·064	0·013
Goroka	123	75 (61·0%)	17 (13·8%)	30 (24·4%)	1 (0·8%)	0·801	0·129	0·071
Total	485	383 (78·97%)	26 (5·36%)	73 (15·05%)	3 (0·62%)	0·892	0·081	0·028
Bainings—New Britain.								
Malassaet Village	77	51 (66·0%)	2 (3·0%)	22 (29·0%)	2 (3·0%)	0·818	0·168	0·014

TABLE IV.

Blood Group Gene Frequencies in Various Populations.[1]

Population.	Authors.	Number Tested.	*A*.	*B*.	*O*.	Number Tested.	*m*.	*n*.	Number Tested.	R^1.	R^2.	R^0.	R^z.	*r'*.
1. *New Guinea*—														
Papuan-speaking[2]	Walsh *et alii* (1953)	216	0·251	0·178	0·571	172	0·087	0·913	201	0·908	0·045	0·047		
Melanesian-speaking[2]	Walsh *et alii* (1953)	181	0·224	0·093	0·683	171	0·197	0·803	171	0·909	0·050	0·041		
Total	Walsh *et alii* (1953)	498	0·245	0·134	0·621	443	0·152	0·848	472	0·915	0·048	0·037		
Daru-Kikori	Simmons *et alii* (1946)	228	0·182	0·196	0·622	228	0·039	0·961						
North-east and South-east Coastal	Simmons *et alii* (1946)	227	0·213	0·126	0·661	227	0·227	0·773						
Total	Simmons *et alii* (1946)	455	0·197	0·160	0·642	455	0·133	0·867	100	0·945	0·020	0·020	0·015	
Chimbu-Nondugl-Mount Hagen	Present survey	362	0·205	0·179	0·616	365	0·021	0·979	362	0·923	0·064	0·013		
Goroka	Present survey	123	0·168	0·102	0·729	123	0·081	0·919	123	0·801	0·129	0·071		
Total	Present survey	485	0·195	0·159	0·646	488	0·036	0·964	485	0·892	0·081	0·028		
Pygmies, Wissellakes	Semple *et alii* (in preparation)	139	0·075	0·139	0·786	139	0·102	0·890	137	0·850	0·121	0·029		
2. *Melanesian Islands*—														
West Nakanai, New Britain.	Simmons, Graydon, Semple and Swindler (1955)	103	0·103	0·206	0·691	103	0·228	0·772	94	0·910	0·039	0·051		
Bainings, New Britain	Present survey	77	0·297	0·252	0·451	77	0	1·000	77	0·818	0·168	0·014		
Admiralty Islands	Simmons and Graydon (1947)	112	0·145	0·134	0·721	112	0·339	0·661	112	0·933	0·038	0·029		
New Hebrides	Simmons, Graydon, Semple and Malcolm (1954)	172	0·117	0·069	0·813	172	0·302	0·698	172	0·790	0·125	0·009		0·076
Fiji	Simmons, Graydon and Barnes (1945)	310	0·210	0·111	0·679	310	0·326	0·674	110	0·845	0·064	0·091		
New Caledonia	Simmons, Graydon and Avias (1949)	558	0·204	0·059	0·731	558	0·297	0·703	558	0·833	0·108	0·055	0·004	
3. *Australia*—														
Aborigines	Simmons, Graydon and Hamilton (1944); Simmons and Graydon (1948); Simmons, Graydon and Semple (1954)	649	0·251	0	0·749	649	0·297	0·703	401	0·648	0·266	0·069	0·017	

[1] The frequencies presented in this table and in Tables I and III have all been calculated from the observed data by one of us (J.J.G.) using Bernstein's corrections for *A*, *B* and *O* and a gene-counting method for Rh suitably modified to take account of genotype frequencies not equivocally determined. These figures closely approximate those obtained by the maximum likelihood method, and differ slightly from those presented in the original publications.

[2] The individuals were classified in Sydney as Melanesian-speaking and Papuan-speaking from a list of names and villages provided.

Indonesia and the Philippines. The Goroka and Baining frequencies are rather similar and with their higher R^2 frequency tend towards the Australian aboriginal figures.

No example of rh^w (C^w) was detected in a total of 441 random blood samples distributed as follows: Chimbu, 64; Nondugl, 77; Mount Hagen, 100; Goroka, 123; Bainings, 77.

The Lewis (Le^a) Blood Group and Secretion of A, B or H Substances.

All of 316 blood samples from the New Guinea districts of Chimbu (38), Nondugl (41), Mount Hagen (116) and Goroka (121) were Le(a–), and of 242 saliva samples from subjects of all blood groups from Chimbu (49), Mount Hagen (99) and Goroka (94), three from Goroka only were from non-secretors. The remainder of the subjects, 239 (98·8%), were all shown to be secretors of A, B or H substances. Blood samples corresponding to two of the three non-secretors were Le(a–); but the blood sample corresponding to the third was hæmolysed on arrival and could not be tested. The possible reasons for incomplete correlation of Lewis (Le^a) and secretor results have been previously discussed (Simmons, Graydon, Semple, Birdsell, Milbourne and Lee, 1952), and it can be stated with some confidence that the incidence of Le(a+) and non-secretors of A, B or H substance in these populations is either very low or zero.

Few racial investigations including tests for the Lewis and secretor genes have yet appeared. Simmons, Graydon, Semple and Taylor (1951) have tabulated secretor percentages for races tested prior to that date, and it would appear from this and later unpublished evidence of our own that the New Guinea Central Highlands people are like the Wissellakes pymgies, Australian aborigines and American Indians in the very low incidence of non-secretors, and differ sharply from natives of Borneo, Java, the Marshall and Caroline Islands, Maoris, Chinese and Ainu, all of whom have a non-secretor and Le(a+) percentage in the range 15% to 30%.

Of 75 Bainings blood samples tested with anti-Le^a serum, 15 (20·0%) were considered to be Le(a+). No saliva samples of this group were collected, and for this and other reasons it would be desirable to confirm this result at a future date.

The P Blood Group.

Tests for the P factor were carried out on 318 blood samples from the four districts of New Guinea and on 38 samples from the Bainings. Of these, 182 (57·2%) and 34 (89·5%) respectively were regarded as giving positive results. With only a weak anti-P serum available, however, the tests had to be read after sixty minutes at 5° C., and many weak reactions tended to disappear on slight warming, so that these results must not be accepted as completely reliable.

The Duffy (Fy^a) and Kell (K) Blood Groups.

When small amounts of anti-Fy^a and anti-K sera became available to us in 1951, a limited series of tests for these factors was performed. Of 18 samples from Nondugl, 22 from Mount Hagen, 30 from Goroka (total 70), all were found to be Fy(a+). The samples tested were less than ten days old. The same samples from Mount Hagen and Goroka were tested for the K factor, and one out of 22 (4·5%) of the former and none out of 30 of the latter was K-positive.

In Bainings 22 out of 22 were Fy(a+). These samples were six months old when tested.

Ability to Taste Phenyl Thiocarbamide.

An attempt was made to include tests for ability to taste phenyl thiocarbamide in the survey, but it was found to be difficult to obtain trustworthy results for the very primitive people concerned. The results for 330 Mount Hagen people are presented with some doubt as to their reliability. Of these, 83 (25·1%) were strong tasters, 96 (29·1%) were weak tasters and 151 (45·8%) apparently could not taste the substance, or at least were not unpleasantly affected by the test as carried out.

Comment.

Reference has been made in this paper to the genetic heterogeneity already demonstrated in New Guinea populations from various localities, and the differences between the Goroka people and those of Chimbu, Nondugl and Mount Hagen (Wahgi valley) found in the present survey provide another striking instance.

Apparently the Wahgi valley populations tested form a reasonably homogeneous group from the blood genetical angle, since their A-B-O and M-N-S frequencies differ only to a degree which can be statistically ascribed to chance variations, and their Rh frequencies, although more significantly different, do not show wide variation. However, the Goroka frequencies are highly significantly different from the pooled frequencies for the Wahgi valley in all three systems. These relationships are probably a reflection of the geography of the area, since the Wahgi valley, from Mount Hagen near its head to Chimbu some 80 miles downstream, is comparatively open, whereas the Goroka district is separated from the Chimbu by the lofty Chimbu Divide, which Capell (1948-1949) considers also marks the sharpest break in language type in all the Central Highlands.

The close resemblance between the gene frequencies for the Wahgi valley people and for the Daru-Kikori people (see Table IV) in all the blood group systems for which comparisons may be made warrants some discussion. Stirling was quoted above as considering that Papuan elements occupy much of the interior of New Guinea and the west and south coasts as far east as the Purari delta, and that Melanesian influences are strongest along the north and south-east coasts. Probably, then, with the exception of the Daru-Kikori people, the groups of the present survey, and the pygmies of the Wissellakes, all other New Guinea populations so far tested may be suspected of being subject to appreciable Melanesian influences. There may then be some justification for ascribing to the Papuan element (Stirling) or the Negritic-Murrayian element (Birdsell) the features of high *B* and very low *m* frequencies mostly found in the south-west and interior so far, and for attributing the lower *B* and higher *m* frequencies mostly found on the New Guinea north and south-east coasts, and elsewhere in Melanesia, to the Melanesian (Stirling) or Carpentarian (Birdsell) influence. Our present small series of Bainings, classified by Birdsell with the Central Highland peoples, also shows in extreme degree the features of high *B* and low *m* frequencies, the *m* gene not even being demonstrated. Walsh *et alii* (1953) have also produced evidence which supports the foregoing theory. These authors classified the subjects of their New Guinea survey, when possible from a list of names and villages, into Papuan-speaking and Melanesian-speaking groups, and showed that there were significant differences between these groups for the A-B-O and M-N-S systems. The writers have calculated gene frequencies from these data, and the results are shown in Table IV. It is seen that here again the Melanesian-speaking group shows lower *B* and higher *m* frequencies than the Papuan-speaking group.

There is no similar sharp distinction between the Rh gene frequencies of the highland groups tested and those of populations from the New Guinea coast and from other Melanesian islands. Walsh *et alii* (1953) also found that the Rh frequencies for their Papuan-speaking and Melanesian-speaking groups were almost identical and both conform to the most usual pattern of very high R^1 ($> 0·9$) and low R^2 and R^o frequencies. Groups which depart from this pattern are the Goroka people of the present survey, the pygmies of the Wissellakes, the Bainings, the New Hebrideans and New Caledonians, all with higher R^2 frequency (0·108 to 0·168). The highest R^2 frequency (0·266) in this region is shown by the Australian aborigines, who may also be considered the most marginal population of the region, and as all these other populations with high R^2 frequency inhabit isolated or marginal regions, this may reflect a higher degree of influence of an older racial component, perhaps identifiable with the Murrayian component postulated by Birdsell. With the exception of the Bainings, these groups with high R^2

frequencies also have *B*, *m* and *S* frequencies lying between those of the Australian aborigines and those of the Wahgi valley natives and the Papuan-speaking groups of Walsh.

In spite of the differences pointed out here, it is nevertheless apparent that all the populations of New Guinea and the Melanesian islands so far tested are of the same basic stock. However, the gene frequency data presented here may well support the current anthropological conception of a predominantly Negritic stock with Papuan or Murrayian and Melanesian or Carpentarian elements superimposed.

It must be stressed that the present analysis is of the most tentative nature, and that much more information is required for the blood gene frequencies of this region, preferably correlated with the most extensive physical and social anthropological observations.

Summary.

1. The A-B-O, M-N-S, Rh, Le^a, P, Fy^a and K blood groups, together with the secretion of A, B or H substances in the saliva and taste-blindness to phenyl thiocarbamide, have been determined in New Guinea natives from four localities in the Central Highlands, and in Bainings from the Gazelle Peninsula of New Britain.

2. The gene frequencies calculated for 485 natives of the Central Highlands are as follows: $A = 0{\cdot}195$, $B = 0{\cdot}159$, $O = 0{\cdot}646$, $ms = 0{\cdot}042$, $mS = 0{\cdot}005$, $ns = 0{\cdot}838$, $nS = 0{\cdot}115$, $R^1 = 0{\cdot}892$, $R^2 = 0{\cdot}081$, $R^o = 0{\cdot}028$. The gene frequencies calculated for 77 Bainings are: $A = 0{\cdot}297$, $B = 0{\cdot}252$, $O = 0{\cdot}451$, $m = 0$, $n = 1$, $S = 0$, $R^1 = 0{\cdot}818$, $R^2 = 0{\cdot}168$, $R^o = 0{\cdot}014$.

3. All of 316 New Guinea subjects tested were Le(a–), and 239 out of 242 (98·7%) were secretors of A, B or H substances in saliva. In Bainings, 15 out of 75 (20·0%) were Le(a+), but no secretion tests were performed.

4. In New Guinea natives, 182 of 318 (57·2%), and in Bainings 34 of 38 (89·5%) were considered P-positive.

5. All of 70 New Guinea natives, and all of 22 Bainings were Fy(a+). In New Guinea samples one out of 52 (1·9%) was K-positive.

6. The results obtained have been compared with other data from New Guinea and neighbouring regions, and the significance of the findings has been discussed.

Acknowledgements.

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INJURIES FROM STONE FISH.

By H. FLECKER,
Cairns.

ONE of the most dreaded fish along the North Queensland coast is the stone fish, *Synanceja trachyna* Richardson, and no other fish except the shark has such a sinister reputation. It is stated to produce very severe symptoms in its victims, from which death sometimes results. G. P. Whitley writes in no uncertain manner about the terrible nature of this notorious and horrible monster; his description is as follows:

> The spines of a Stone Fish can penetrate a sandshoe to enter a wader's foot. This poison is extremely virulent, the Stone Fish being the most venomous fish known, and immediately causes fearful pain so that a person may become almost demented, may fall in the water, and thereby risk drowning, his limbs may swell, and if he cannot obtain medical treatment, he may die.

Similar gloomy accounts are found in many places in all sorts of literature, and are accepted as common knowledge amongst the inhabitants along the Queensland coast and elsewhere. A natural history column in a southern popular daily newspaper recently published an account of the dire injuries which this terrible monster is capable

of inflicting, in such terms as are currently used. However, an effort to discount such stories from the lack of adequate evidence led to a communication which stated that still another great authority on natural history had agreed with the published version, and that therefore no correction would be made.

The fish is quite common and well known to those familiar particularly with the Great Barrier Reef. Whitley has shown that the particular species is *Synanceja trachyna* Richardson, family Synancejidæ; it is reported from numerous Queensland localities, extending from as far south as Moreton Bay, throughout the east coast of Queensland, Torres Strait, Darwin and Port Hedland and Houtman's Abrolhos in Western Australia, with some extralimital forms. It is frequently referred to as *Synanceja horrida* (Linnæus), but this is an Indian species wrongly recorded from Australia. It is a particularly hideous and repulsive-looking fish which lies lazily on the sandy bottom, well camouflaged, resembling somewhat a very dirty, drab and grimy piece of boulder with patches of green algæ. Moreover, it will not move unless disturbed.

Despite the common belief that this fish frequently produces death, no authentic record of any such casualty which will bear the light of critical investigation can be found in any literature. A well-known medical officer formerly stationed at Thursday Island is reported to have died as the result of a sting from this creature; but information supplied by his son indicates clearly that this was not the case.

Dr. J. V. Duhig and Dr. Gwen Jones give an excellent description of the dorsal spines as well as the venom apparatus, demonstrating the muscular mechanism *et cetera* by which the poison is injected. The toxicology of the venom has likewise been examined and experiments on laboratory animals have been carried out. Moreover, they publish clinical notes of a case of poisoning of this fish in the Pioneer River, Mackay, in 1925, provided by Dr. M. J. Gallagher; this is the only record of a really serious injury which can be found. The victim was totally incapacitated for over four months. A month after the injury, a large denuded area over the instep, which had sloughed out, had to be skin grafted. Three years later, it was reported that the patient was well, and had only slight limitation of extension of his ankle, insufficient to cause any real disability. However, a certain element of doubt is still present as to whether this victim actually was stung by the stone fish for the following reasons: (*a*) No earlier record of an injury of similar intensity which can be definitely substantiated can be found. (*b*) In the thirty years which have since elapsed, still no further record can be found. (*c*) The sole witness was the victim himself, who, Dr. Gallagher reports, saw and identified the fish. The notes record that it was on the "evening" of February 22, 1925, that he stood on the fish. Although the hour is not stated, it is possible that owing to poor light he was unable to recognize with certainty the identity of his assailant, especially if it was seen only through the water at the bank of the river. (*d*) The notes record that the "spine" (in the singular) of the fish entered the sole between the ball of the great toe and that of the little toe; but the fish has a whole row of spines, and is it possible that a single spine, without its neighbours, could penetrate so deeply as to produce such a serious injury? (*e*) Dr. Gallagher writes of the wound more than once and only in the singular, which supports the comment in (*d*). (*f*) There is some uncertainty in the meaning of Dr. Duhig's concluding remark: "On the whole, however, I am inclined to attribute this striking effect to the Synanceja's venom." Does it suggest that he believes that possibly it may not be due to such venom?

Reports in the lay Press of stings from the stone fish are far from rare and include accounts of victims in freshwater streams well above tidal streams, such as Freshwater Creek and at the Kamerunga Crossing, both popular bathing resorts many miles above the tidal limits of the Barron River. According to Whitley stone fish are strictly marine, and whilst they may enter river mouths, their presence in fresh water has not been recorded. However, the barefooted bathers in such freshwater streams have actually stood on the bullrout, *Notesthes robusta*, a rather small fish belonging to the family Scorpænidæ, and armed with poisonous preocular spines along its back through which the fish ejects its venom as it lies more or less motionless between the boulders on the rocky bed of the stream. The victim yells with pain, which often needs a hypodermic injection of morphine and may require his admission to hospital, but he is invariably released next day free from pain. Juveniles and adults alike invariably attribute such injuries to the stone fish. Another such injury was reported recently in the lay Press from Garradunga, many miles up the North Johnstone River beyond its junction with the South Johnstone, which again is miles upstream from the mouth of the Johnstone River at Flying Fish Point.

Other similar incidents are likewise frequently reported in the lay Press. Attempts to investigate these have almost invariably ended in failure to connect convincingly the injury with the fish concerned. In many cases the victim had not seen the fish, and in any case the injury is not generally very severe, and the patient may not have been admitted to hospital; but the Press agents are always eager to report the injury for its news value, not being very particular about the truth.

A sample of many such incidents is that reported recently by wireless and in the lay Press of a victim stung by a stone fish at Mossman. Dr. R. B. Anderson reports that the patient, a man, aged thirty years, applied for admission to hospital, but at first was refused. It is not stated whether the victim actually saw the offending fish. However, he was admitted later and given a hypodermic injection of morphine, but was discharged next morning.

The writer knows of two patients presenting themselves on different occasions at the out-patient department of the Cairns Base Hospital, each carrying a stone fish, which had produced injuries for which treatment was desired. The first was examined by the late Dr. Muriel Pringle, and as the effect was quite trivial, the patient was not admitted to hospital. Dr. Pringle had promised to supply full clinical notes, but unfortunately she died before this could be done. The second case evidently was no less trivial, for the medical officer who examined the patient did not admit him to hospital, and took no interest in the fish presented. Accordingly the victim brought it along to me, and there was no difficulty in recognizing the stone fish.

Dr. John Healey reports the following case from Cooktown:

A young man, aged twenty-six years, was brought to Cooktown Hospital in considerable pain, having been stung on the right hand by one of the spines of Synanceja as he was pulling in a fishing net. He identified the species positively by comparing it with a specimen kept at the hospital. He was given two cubic centimetres of a 2% solution of "Procaine" and 0·25 grain of morphine, and later "Procaine Penicillin" and tetanus toxoid, and mild anti-shock treatment was instituted as he was in a state of syncope. He made an uneventful recovery, and was discharged after a day in hospital.

Dr. Healey adds that he did not remove the tiny tip of the spine, which was probably left behind, as the patient did not complain of any significant residual tenderness.

Summary.

1. Although in Queensland the stone fish is the most dreaded of all fish, except perhaps the shark, no substantial basis for this bogy can be found.

2. The venom apparatus has been described and much fine work on the venom has been carried out elsewhere, which theoretically should cause respect for the potential danger of this fish.

3. No death from the venom has so far authoritatively been recorded.

4. One severe case and one only can be discovered in the literature, and even in this there is a slight element of doubt as to the identity of the aggressor. Other cases of severe injury ascribed to the stone fish will not bear the light of critical investigation.

5. Reports in the lay Press and over the wireless are generally untrue or misleading.

6. A few authenticated injuries have been shown to be trivial.

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Addendum.

Since writing the foregoing, I have received a reprint from *Copeia* (1951), Number 3, August 31, page 207, entitled "A Case of Poisoning by the Stonefish, Synanceja Verrucosa", by J. L. B. Smith, in which the author describes the very severe effect of a sting on the thumb. There was no question concerning the identity of the fish, which was captured alive in Mozambique, Portuguese East Africa, and placed in a collecting tray before the subject was stung. He gives much detail of the excruciating and intense agony which he suffered, the swelling reaching ultimately to the level of the elbow. Apart from "Novocain" and morphine, he received considerable relief by immersing his hand in hot water. Treatment with penicillin limited the inflammatory process. After fourteen days, the hand and thumb only were still swollen, but painful and unusable. After thirty days the black portions (of the thumb) commenced to fall away, leaving pink scars. After about eighty days, the hand was still weak and the thumb was barely movable at the joint, being still slightly swollen and painful when moved. The toxin had a pronounced adverse effect on the patient's general health and condition.

THE TREATMENT OF TETANUS BY SEDATION, CURARIZATION AND INTRATRACHEAL POSITIVE-PRESSURE ARTIFICIAL RESPIRATION, WITH REPORT OF A CASE.

By P. M. LAST[1] and JUDITH NICHOLAS,[2]

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WHEN a patient has severe tetanus the essential problem is to keep him alive until the effects of the toxin have been overcome. This is shown by the equivalent results which have been obtained by the use of sedation and relaxation, combined with two different methods of artificial respiration—the use of the tank respirator or intratracheal positive pressure respiration. This case is reported in order to record our experience with the latter technique and some of its possible complications. A previous report from the Clinical Research Unit of the Royal Melbourne Hospital and the Walter and Eliza Hall Institute of Medical Research (Saint *et alii*, 1953) has recorded the use of another technique—namely, sedation and partial curarization without artificial respiration.

Report of a Case.

A young man who suffers from atopic eczema and asthma was admitted to the Royal Melbourne Hospital on February 28, 1953, at the age of nineteen years, with a compound fracture of the right tibia and fibula; he received then 5000 units of antitetanic serum. In spite of repeated manipulations, malunion occurred, and on March 2, 1954, the position was corrected by osteotomy, and a sliding bone graft and plate were inserted. Union then occurred, but some osteomyelitis developed, and on August 26, 1955, the plate was removed. One cavity at the site of a screw was curetted and packed with bone chips taken locally, and the wound was then closed without drainage. Ten days later (September 5) it was found to be infected, and two sequestra were discharged. On September 12 two grossly carious teeth were removed, and he was noted to have some trismus. The next day the patient complained of a sore back, and there was spasm of the lumbar muscles, but no other abnormality.

On September 14 he had slight trismus, severe abdominal rigidity and opisthotonos. During that morning he had his first tetanic spasm. After the administartion of sodium pentobarbitone and mephenesin, the wound was inspected in the ward and three sequestra were removed. Lumbar puncture was performed and normal cerebro-spinal fluid was obtained. After preliminary skin tests he was given 100,000 units of antitetanic serum intravenously and intramuscularly, and started on a course of penicillin and streptomycin. During that afternoon he had repeated tetanic spasms, which could not be controlled by heavy sedation and intermittent intravenous injections of mephenesin. The patient was transferred to the Clinical Research Unit of the Royal Melbourne Hospital and the Walter and Eliza Hall Institute. Under heavy sedation intravenous therapy was begun. He was taken to the operating theatre and given a general anæsthetic, and two surgeons working simultaneously performed further wound *débridement* and a high tracheotomy; a gastric tube and Foley vesical catheter were inserted.

Curarization was maintained for the next six days with positive-pressure artificial respiration by means of an anæsthetic machine and manual and mechanical respiration. Sedation was obtained by the administration of nitrous oxide and oxygen, with intermittent intravenous injections of sodium pentobarbitone. Pulmonary collapse occurred, for which bronchoscopy was performed on six occasions; but resolution was not complete until spontaneous breathing was resumed. After an initial leucocytosis granulocytopenia developed, together with anæmia, which required blood transfusion. The chronic skin condition improved greatly during the period of artificial respiration, but bronchospasm was frequent and moderately severe. He was given five more doses of antitetanic serum, to a total of 265,000 units. Attempts at culture and mouse inoculation tests performed for *Clostridium tetani* gave negative results.

When spontaneous respiration was resumed, relaxation was obtained by mephenesin given orally and sedation by the oral administration of barbiturates, paraldehyde and chloral hydrate. Abdominal rigidity and mild spasms persisted until October 1, seventeen days after the first spasm, when severe spasms recurred, which were controlled by increasing the dose of mephenesin and sedatives given by mouth. On October 11 the tracheotomy wound closed, and mephenesin and sedatives were discontinued two days later. The leg wound was skin grafted and healed well, and the patient was discharged from hospital on October 26. He has since resumed work, with no residual disability, and the fractures have united.

Diagnosis and Estimation of Severity.

As soon as the clinical diagnosis is established and swabs have been taken, an attempt should be made to estimate the severity of the disease. The length of the incubation period and the interval between the onset of the first symptoms and the first spasm are both inversely proportional to the severity of the case, but it is important to realize the difficulty of this assessment. It is undoubtedly wiser to err towards an overestimation rather than the reverse.

Sedation and Relaxation.

In a severe case the first necessity is to begin adequate sedation and relaxation, because any disturbance will tend to provoke spasms. Procedures such as the giving of injections, posturing, inspection of the wound and nursing activities must be timed to coincide with phases of heavy sedation and adequate relaxation. Although Forbes and his colleagues (1955) have successfully treated 15 patients with severe tetanus by sedation alone, we believe that it is wiser to supplement the sedative with a muscular relaxant. A combination of central respiratory depression and partial respiratory paralysis produces anoxia and respiratory acidosis, which may be aggravated by pulmonary collapse. This demands either assistance of inadequate spontaneous respiration or full curarization and artificial respiration. The poliomyelitis epidemic in Denmark in 1952 showed that in an emergency even medical students and nurses could perform positive-pressure artificial respiration. In a single case this is unnecessary, but full-time attention by medical staff trained in anæsthesia is essential.

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[2] Registrar in the Department of Anæsthesia, February, 1956.

In our case treatment was begun with intermittent intravenous injections of barbiturates and mephenesin, which permitted initial inspection and *débridement* of the wound, lumbar puncture and the administration of antitetanic serum. Later the same day it was obvious that this would not suffice to control the frequent and severe spasms, and that greater muscular relaxation would be needed. The patient was very heavily sedated in the ward and taken to the operating theatre for the procedures mentioned above.

He was returned to a special room equipped with all necessary nursing facilities and suction apparatus, oxygen, bronchoscope and anæsthetic equipment. It was clear that curarization would have to be continued, supplemented by basal sedation with nitrous oxide and oxygen, and small intermittent intravenous doses of sodium pentobarbitone. During the same night the patient had great respiratory difficulty, with inadequate and irregular spontaneous respiration and severe bronchospasm. The latter was relieved by intravenous injections of aminophylline and intramuscular injections of antihistaminics ("Antistine"), small subcutaneous doses of adrenaline, and a single injection of adrenaline in oil. Bronchospasm recurred occasionally throughout the period of controlled respiration, but was not severe. Inadequate spontaneous respiration, bronchospasm and signs of respiratory acidosis and anoxia demanded full curarization, with manual control of respiration. During the next six days three separate attempts were made to allow spontaneous breathing, sedation being maintained with nitrous oxide and oxygen. Each was unsuccessful because of repeated spasms, carbon dioxide retention and hypoxia.

By September 21, six days after the tracheotomy, adequate relaxation could be maintained by the oral administration of mephenesin in a dose of 36 grammes per day, combined with oral sedation with paraldehyde, one drachm every hour, and barbitone, 10 grains every four hours. A metal tracheotomy tube was inserted instead of the cuffed rubber endotracheal tube, and on September 26 the gastric tube and catheter were removed. Relaxation and sedation were continued into the period of convalescence; but on October 1 true tetanic spasms recurred. These were readily controlled by resumption of the high oral dose of mephenesin and fairly heavy oral sedation. On October 12 the administration of mephenesin was discontinued and sedation the next day, after which the patient made an uneventful recovery.

Pulmonary Complications.

It has long been recognized that one of the major causes of death in tetanus, regardless of treatment, has been pulmonary infection. Between 1932 and 1943, 32 patients suffering from tetanus were admitted to the Royal Melbourne Hospital, and 25 died. From 1944 to 1955, of 33 patients admitted to hospital, 10 died. The improvement dates from the introduction of penicillin, whose action on secondary invading organisms, particularly in the lung, may well be more important than on *Cl. tetani* itself. It is in order to anticipate and control pulmonary complications that early tracheotomy has been widely adopted, and its value has been established.

On the morning after the tracheotomy an X-ray film taken with a portable machine revealed collapse of the upper lobe of the right lung and of the whole of the left lung (Figure I). The endotracheal tube could be seen in the right main bronchus and this had contributed to the pulmonary collapse. After bronchoscopy the left lung expanded fully, although there was later partial collapse of the lower lobe of the left lung (Figure II). The upper lobe of the right lung remained collapsed until the patient was able to cough for himself. Clinical examination was quite inadequate in assessing either the site or the extent of the collapse.

Pulmonary collapse was treated by bronchoscopy, postural changes and manual percussion. Cultures of the mucopus aspirated from the trachea were prepared every second day, and the organisms isolated were attacked with antibiotics according to their sensitivity.

Bronchospasm.

With an endotracheal tube in position, bronchospasm demands checking of position, tracheal toilet and heavier sedation or curarization without the need for antispasmodics. Since childhood this patient had been subject to attacks of asthma, often precipitated by respiratory infection, and during the period of controlled respiration bronchospasm occurred occasionally. During his convalescence an attack of asthma responded to ephedrine.

Antibiotics.

Penicillin was given in a very high dose from the start —10,000,000 units daily—and to enhance its action and reduce the frequency of injections probenecid ("Benemid"), two grammes per day, were given by stomach tube. Streptomycin was given in a dose of two grammes per day for the first two days, then one gramme per day for seven days. Tetracycline and chloramphenicol later supplemented the penicillin when bacterial sensitivities indicated their use. Since we could find no certain information of any other antibiotic acting on *Cl. tetani*, we continued the high dose of penicillin and probenecid throughout. Sulphonamides were not used.

Drug Toxicity.

Granulocytopenia.

In a series of four cases of severe tetanus treated by prolonged curarization with d-tubocurarine chloride ("Tubarine"), one for seventeen days, Lassen *et alii* (1954) described two cases of granulocytopenia, one of which was fatal. On September 16, two days after the first spasm, our patient had a polymorphonuclear leucocytosis of 30,000 per cubic millimetre; but as treatment continued the number of leucocytes steadily fell to 2600 per cubic millimetre six days later, and only 1400 of these were polymorphonuclear (Figure III). By this time he had received 27 different drugs, which included antibiotics (of which chloramphenicol was not one), sedatives, antispasmodics, antihistaminics and relaxants. Dr. G. C. De Gruchy was consulted about this problem, and he suggested that the most likely provocative drug was "Antistine". No more was given and the white cell count rose steadily until October 3. A medical officer who did not know of this hazard then ordered two further doses, each of 50 milligrammes, and the white cell count correspondingly fell (Figure III). In view of the experience of Lassen *et alii* (1954), it may well be that d-tubocurarine chloride was also responsible, and perhaps the effects of the two drugs were cumulative.

Mephenesin.

It was fortunate that this patient tolerated mephenesin well, taking 36 grammes orally per day for twenty-two days without ill effect. Its commonest toxic action is hæmoglobinæmia, followed by hæmoglobinuria, and it may also lead to venous thrombosis and bleeding tendencies. The urine was examined spectroscopically each day during the administration of mephenesin, and hæmoglobinuria was never detected.

Nursing Care.

By far the most important principle to stress is the need for careful timing of all procedures and manipulations to coincide with periods of full curarization and sedation. Trained physiotherapists can assist greatly in supervising posturing and percussion for pulmonary collapse, and in manipulating limbs to prevent contractures, foot drop, *et cetera*. Considerable thought was given to planning the layout of the room where our patient was treated, equipment and drugs being collected together ready for use on labelled shelves. A blackboard on which the current instructions were written proved very useful.

Management of Positive-Pressure Artificial Respiration.

Special rubber-cuffed endotracheal tubes for use with a tracheostomy were not available, so standard cuffed tubes were cut down to the right length; the distal end was trimmed and cut square, the bevel being a potential cause

of an obstructed airway. On the first day after tracheotomy an endotracheal tube was inserted too far, and this contributed to the pulmonary collapse described above (Figure I). Another obvious error in technique is over-inflation of the balloon. Mediastinal emphysema may occur and is a potentially dangerous complication. As far as possible the tube should not be moved once it is in place, as even a slight adjustment may "trigger" a series of tetanic spasms.

To obtain a basal level of sedation during the six days of curarization, nitrous oxide and oxygen were used in a ratio of 1:1, run through a circle type carbon dioxide absorber, with hourly changes of soda-lime. A mechanical respirator was tried several times and worked moderately well, but constant medical supervision was still essential.

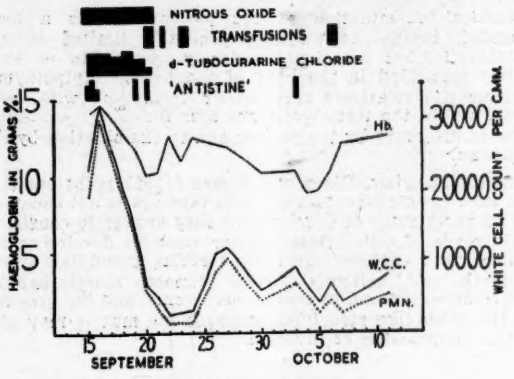

FIGURE III.

Graph to show the changes in hæmoglobin value (Hb), total white cell count (W.C.C.), and total polymorphonuclear cell count (P.M.N.) during treatment of a patient with tetanus. The gross fall in the polymorphonuclear cell count was attributed to "Antistine" or d-tubocurarine chloride.

Aspiration of mucus through the endotracheal tube needs to be performed quickly and gently, and the pressure exerted by the suction apparatus must not be excessive. Sodium bicarbonate solution (5%) was instilled into the trachea at intervals in order to limit caking of mucus. Atropine is probably best avoided; but there were several occasions when secretion was copious and watery and was controlled by small doses (1/300 of a grain).

Immunity.

For many years antitetanic serum has been accepted as a basis for prevention and treatment of tetanus. The problem in this case was the effect on the immunological mechanisms of repeated high doses of antitetanic serum. The patient received 5000 units of antitetanic serum when he sustained his original compound fracture, two and a half years before he developed tetanus. On September 14, 1955, when he had his first tetanic spasm, he was given 80,000 units, and over the next twelve days four more doses to a total of 265,000 units. In spite of these doses, which are quite adequate by accepted standards, true tetanic spasms recurred on October 1, and he was given a further 50,000 units that day. The pamphlet issued with antitetanic serum by the Commonwealth Serum Laboratories recommends that daily injections of serum be given throughout the course of the disease, and that they should be continued into the period of convalescence. Since the antitoxin is a modified horse globulin, it will itself act as an antigen, and antibodies will develop against it. After a certain stage, possibly seven to ten days after the initiation of intensive antitoxin treatment, the antitoxin will be rapidly removed from the circulation, as a result of reaction with these antibodies. Under these circumstances the therapeutic effect may be negligible. Littlewood, Mant and Payling Wright (1954) describe a fatal case of tetanus in which this factor may have contributed to the outcome. In our case spasms recurred on October 1, seventeen days after the beginning of intensive serum therapy, and it is conceivable that this may have been related to the same phenomenon.

The value of tetanus toxoid in conferring active immunity is well known and should not need to be stressed. Tetanus is an uncommon disease, but it is entirely preventible. In another hospital, one of us (P.M.L.) has seen a case of tetanus following a bone graft, and it would seem well worth while to practise universal active immunization of all patients being prepared for bone surgery. This case emphasizes that all patients with compound fractures or penetrating wounds should have tetanus toxoid administered as a routine procedure, because latent infection, although rare, is well known, and cases of recurrent tetanus after such injuries have been reported.

Summary.

1. A case is described of severe tetanus, which was successfully treated by sedation, curarization and inspiratory phase positive-pressure artificial respiration for six days.

2. The principles of management are outlined and complications discussed. In this case artificial respiration was supplemented by the use of antitetanic serum, wound *débridement*, early tracheotomy and the administration of antibiotics. Extensive pulmonary collapse and pneumonia needed repeated bronchoscopy. Granulocytopenia and anæmia occurred and were attributed to sensitivity to "Antistine" or d-tubocurarine chloride.

3. Immunological factors are discussed with reference to repeated doses of antitetanic serum.

4. The value of active immunization, especially in patients with compound fracture or undergoing bone surgery, is stressed.

Acknowledgements.

We wish to acknowledge the help and guidance in the treatment of this patient which we received from the medical and nursing staff of the Royal Melbourne Hospital. His treatment taxed the resources of a well-staffed hospital. We wish to thank Dr. B. T. Keon-Cohen for permission to report this case, and the medical staff of the Royal Melbourne Hospital for allowing us to examine the records of the hospital. Sir Macfarlane Burnet helped us in elucidating the immunological problems, and Dr. Ian Wood and Dr. Patricia Wilson gave us valuable advice and encouragement.

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Addendum.

Since submitting this paper, we have been most interested to read of the experiences of H. C. A. Lassen and his colleagues (1956) (*Lancet*, 1: 527). They also noted the appearance of generalized marrow depression in cases of tetanus treated by this technique. Their opinion is that commercial nitrous oxide or its impurities may be responsible.

Legends to Illustrations.

FIGURE I.—Postero-anterior X-ray film of lungs in a case of severe tetanus, taken one day after tracheotomy, showing position of endotracheal tube, collapse of upper lobe of right lung, and extensive collapse of lower lobe of left lung with compensatory emphysema.

FIGURE II.—Antero-posterior X-ray film of lungs taken six days after tracheotomy, showing persistent right apical collapse. The original films show collapse of the lower lobe of the left lung.

Reports of Cases.

ADENOMATOID TUMOUR OF THE EPIDIDYMIS: A CASE REPORT.

By S. LIVINGSTONE SPENCER AND L. R. FINLAY-JONES,
Sydney.

THE objects of this report are to describe a case of adenomatoid tumour of the epididymis and to review the subject briefly. Adenomatoid tumours of the epididymis are not common, but are probably less rare than might be concluded from the small number of cases reported—89 according to Dixon and Moore (1952). It is important that this benign lesion should be recognised clinically or, at latest, when the organ is exposed at operation. Failure to do so carries the risk that the condition will be regarded as a malignant growth of the testis, and that the patient will be subjected needlessly to heavy irradiation or radical surgery.

Clinical Record.

A male taxi-driver, aged forty-three years, married, with no children, was referred to one of us (S.L.S.) by Dr. Colin Ratcliff. The patient was complaining of a rounded swelling in the right side of the scrotum which he had discovered one month previously. There was no history of trauma or of previous trouble relevant to the testes. There had been no pain, but the patient said that the swelling "gets in the road a bit".

Examination of the patient revealed the subject to be obese, but otherwise the findings were negative except for the presence of a small, firm, round swelling at the lower pole of the right epididymis. Slight tenderness was complained of when the swelling was squeezed. A provisional diagnosis of epididymal cyst was made and operative removal was advised. Permission was obtained for orchidectomy should the operative findings appear to indicate such a step.

At operation the lower portion of the epididymis was removed with the contained swelling. After removal the nodule was bisected, and the naked-eye appearances suggested a simple neoplasm of rather fibrous structure.

Pathological examination of the specimen showed it to be a portion of epididymal tissue measuring 2·3 centimetres in maximum extent. It contained a firm, circumscribed nodule which measured 1·2 by 1·0 by 0·8 centimetre. The cut surface was pale and fibrous.

On microscopic examination the nodule consisted of small glandular structures separated by a fibrous tissue stroma (Figure I). The glandular structures were lined with a single layer of cells, which varied in appearance from place to place. Some cells were closely packed, cuboidal and epithelial in character, whilst others were flat and resembled endothelium (Figure II). Cytoplasmic vacuoles were occasionally found. Most of the nuclei were oval and had a conspicuous nucleolus. A search for mitotic figures was unsuccessful. A few of the gland-like structures were present amongst smooth muscle bundles at the periphery of the specimen. They appeared empty, none containing fluid, red cells or leucocytes.

Discussion.

It seems probable that the condition was first reported in 1915 by Sakaguchi, under the term "adenomyoma". Various other writers have referred to these tumours, but there has been no unanimity regarding their precise origin. Codnere and Flynn (1946) remark that "the theories concerning the parent tissue about equal the number of observers". Gordon-Taylor and Ommaney-Davis (1941) considered that the tumours were derived from aberrant cells in connexion with the mesonephric ducts. Fifteen cases were reviewed by Golden and Ash (1945), who emphasized the benign nature of these tumours and suggested "adenomatoid" as a term to cover their structure and behaviour.

The tumours are found most frequently between the ages of twenty and forty years, but have rarely been encountered in infancy (Burros and Maycock, 1950). The patient usually comes for advice because he has found a small swelling in his scrotum which he sometimes refers to as a "stone" or a "hydrocele". There may be complaint of "heaviness", and in about 25% of cases, according to Dixon and Moore (1952), some pain is experienced. If the patient has had the swelling under observation for a period (long histories are not unusual), he will have noticed only a very slow increase in size. It is somewhat difficult to reconcile the symptoms of heaviness and pain, when present, with the small, slowly growing tumour; but it is interesting to note in the case reported above that the patient, although his swelling had an average diameter of only one centimetre, complained that it "got in the road a bit".

Clinical examination of the patient reveals a firm, rounded, insensitive swelling generally limited to the epididymis, but occasionally closely applied to or even partly embedded in the body of the testis. Epipdidymal tumours lie relatively superficially (compared with swellings within the testis) and are therefore more accessible both to discovery by the patient and to examination by the clinician.

In their review, Dixon and Moore (1952) point out that the microscopic structure of these tumours is not constant. At an early stage of development they appear to consist of solid cords of cells. Intracellular vacuoles develop which enlarge and coalesce centrally, forming gland-like spaces from the solid columns of cells. Smooth muscle bundles are commonly found in the fibrous stroma, and the presence of the gland-like structures amongst the muscle may give a false impression of invasion.

Acknowledgement.

We wish to thank Mr. R. Money, Sydney Hospital photographer, for the preparation of the photomicrographs.

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PYOPNEUMOPERICARDIUM: REPORT OF A CASE.[1]

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PNEUMOPERICARDIUM AND PYOPNEUMOPERICARDIUM are rare complications of disease and usually signal a fatal outcome. In cases resulting from trauma early recognition leads to correction.

A review of the literature on this subject yields a description of almost 90 cases. Although it is postulated in the report by Willy Meyer (1948), he does not give authority for pyopneumopericardium's being due to erosion into the pericardium by a carcinoma of the bronchus, and further search of the literature for this has been unsuccessful. It is the intention here to report such a case.

[1] From the Departments of Surgery, Albany Medical College and Albany Hospital, Albany, New York.

Clinical Record.

A sixty-two-year old white unemployed widower was admitted to the surgical service of the Albany Hospital on June 11, 1953, complaining of pain in arms, neck and back, becoming worse over a six-month period. During

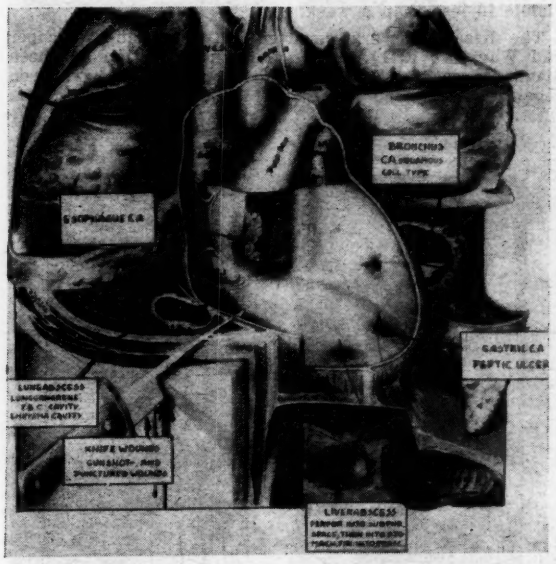

FIGURE II.
Pathogenetic factors which may produce pneumopericardium or pyopneumopericardium are diagrammatically shown.

the two weeks prior to his admission to hospital his left arm had felt "dead", and he had noticed several rapidly growing lumps in the subcutaneous tissues of his arms and legs.

A previous admission to hospital in October, 1951, for epidermoid carcinoma of the uvula had led to partial pharyngectomy and right radical neck dissection. In June, 1952, left radical neck dissection for lymph node metastases had been performed. One month prior to the reported admission to hospital, he had been treated for neuralgia of the left arm and carbuncle of the suboccipital region.

On physical examination he was noted to be an emaciated, elderly man complaining bitterly of pain in his left arm. Examination of the head and neck revealed evidence of bilateral neck dissection and absence of pharyngeal tonsils, pillars of fauces and uvula. There was also a large fungating mass on the back of his neck. Lymph nodes were palpable in the left axilla, and firm nodules were felt in the subcutaneous tissue of both forearms and the chest wall. Examination of the chest revealed diminution of percussion note at the left lung base, accompanied by bronchial breath sounds in this area. The right lung was normal clinically, and the heart sounds, although normal, were distant. The remainder of the findings on physical examination were essentially negative.

On his admission to hospital chest X-ray examination revealed pneumonitis at the left lung base; the lung fields were otherwise normal. The hæmogram revealed a hæmoglobin value of nine grammes *per centum*, and a leucocyte count of 16,000 cells per cubic millimetre. The urine was normal. The results of a Wassermann test were negative.

Despite a fair appetite and better spirits as a result of hospital care, the patient's physical condition deteriorated; the fungating mass on the neck was submitted to biopsy with a punch, and examination revealed infiltrating squamous-cell carcinoma.

X-ray films taken on July 6 showed clearing of the previously described pneumonitis, but the presence of an infiltrate in the fourth left intercostal space anteriorly was suggestive of metastatic cancer in the lung.

On the morning of July 13, 1953, the patient was found in a semicomatose condition, with a thready pulse of 120 beats per minute and a respiration rate of 36 per minute. The breath sounds were diminished over both lung fields, and there was an extensive area of tympany anteriorly over the precordium. An X-ray film of the chest (Figure I) taken shortly before death revealed hydropneumopericardium.

Autopsy Report.—At autopsy widespread metastatic epidermoid carcinoma was found. The mediastinal and axillary lymph nodes, ribs, adrenal glands, right kidney, diaphragm and subcutaneous tissue of the arms and neck were involved. There was a carcinomatous mass in the left main bronchus, which partially occluded its lumen and extended to the pericardial sac. The mass exhibited areas of central necrosis with multiple excavations, one of which had eroded into the pericardium, thus establishing continuity with the bronchus. There was air and fibropurulent exudate in the pericardial sac.

Discussion.

This clinical entity was known to Laennec (quoted by Willy Meyer, 1948), and in 1858 Buist reported autopsy findings in such a case. However, in 1844 Bricheteau had previously diagnosed hæmopneumopericardium, and confirmed it at autopsy. In his report he enumerated the signs and symptoms and contributed the diagnostic sign of *roux moulin* (mill wheel).

Willy Meyer reviewed the literature and reported a case in 1948. He categorized the ætiology at that time, but no instance due to bronchogenic carcinoma is reported, though it is postulated. His analysis of pathogenetic factors is diagrammatically represented in Figures II and III.

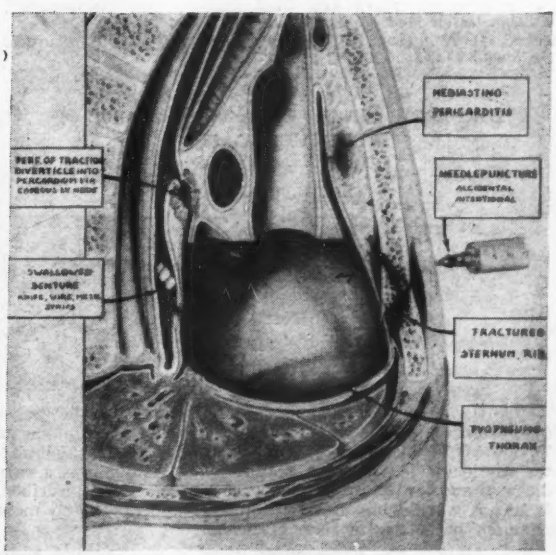

FIGURE III.
Pathogenetic factors which may produce pneumopericardium or pyopneumopericardium are diagrammatically shown.

Sharp precordial pain is usually the first symptom, followed by cyanosis, faintness, acute upper abdominal pain and a peculiar fluttering sensation accompanying each heart beat. Varying degrees of respiratory distress and clinical manifestations of shock may be present early. On examination tympany is found in the "area of cardiac

dullness", which changes with the position of the patient. The heart sounds resemble the splashing of a mill wheel in water (*roux moulin*).

Cardiac tamponade becomes a significant factor when the intrapericardial pressure rises sufficiently to impair diastolic filling of the heart, and then a falling systolic pressure, rising venous pressure and a silent heart are in evidence.

The radiographic picture of a border parallel to but separated from the heart by air, which may contain a fluid level, is diagnostic. This can be further confirmed by pericardial aspiration by the paraxiphoid route.

Pneumopericardium is not to be confused with mediastinal emphysema, wherein the tympanitic area is constant in various positions and the heart sounds are normal or distant. Moreover, mediastinal emphysema usually extends into the neck tissues, where it can be felt.

The treatment of pneumopericardium and pyopneumopericardium is dictated entirely by its pathogenesis.

Summary.

1. What is believed to be the first reported case of pyopneumopericardium due to erosion of the pericardium by extension of carcinoma of the bronchus is presented.

2. The pathogenetic factors are shown diagrammatically.

3. The symptomatology is described and diagnosis discussed.

Acknowledgement.

The author expresses appreciation to Dr. L. H. Van Mierop for his excellent illustrations, and to Dr. R. D. Alley for his advice on the preparation of this report.

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TORULOSIS IN QUEENSLAND: REPORT OF FOURTEEN CASES.

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AND

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TORULOSIS is a fungous disease caused by the yeast *Cryptococcus neoformans*. The organism is also known as *Torula histolytica* and *Torulopsis neoformans*. The characteristic lesion is a mucoid granuloma. Though it is a rare disease and only about 200 cases have been described, it has a world-wide distribution. It appears to be more common in Australia than elsewhere.

The disease has occurred in most organs of the body, including bone, skin and subcutaneous tissue, kidney, spleen, liver and lymph glands. However, the majority of infections occur in lung and central nervous system, and lesions in the other organs, though they may be localized, are usually terminal. The lung lesion is often asymptomatic; but involvement of the meninges and brain causes signs of meningeal irritation and intracranial compression and sometimes localizing signs. Torula meningitis is almost invariably fatal.

The diagnosis is usually made by the presence of the typical cryptococci in the cerebro-spinal fluid. These are round or oval, about 6μ in diameter, with a large clear capsule up to 30μ in diameter, which is difficult to see in the counting chamber where the organisms may be mistaken for red cells. If an Indian ink preparation is made, the capsules are vividly displayed (Figures I and II). The organism will grow on blood agar, but more luxuriantly on Sabouraud's agar and other acid media. Growth is usually visible in less than a week.

The disease was first reported in Queensland by Hooper and Wannan (1941). Since then the condition has been diagnosed several times, but no further cases have been reported. We wish to report 14 cases of torulosis from Queensland.

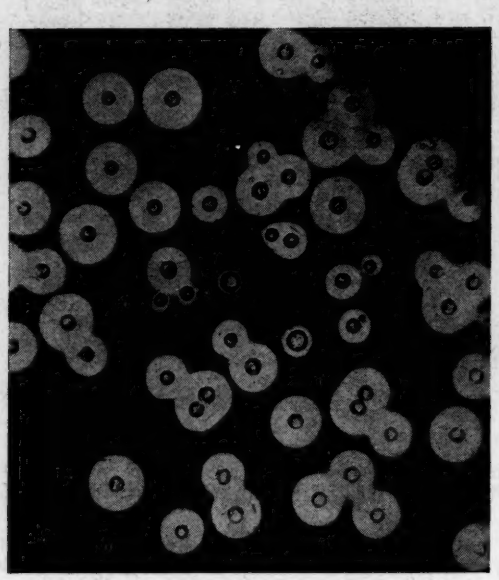


FIGURE I.

Indian ink preparation showing capsules of *Cryptococcus neoformans* from peritoneal fluid of mouse (× 250). Organism isolated in Case VI.

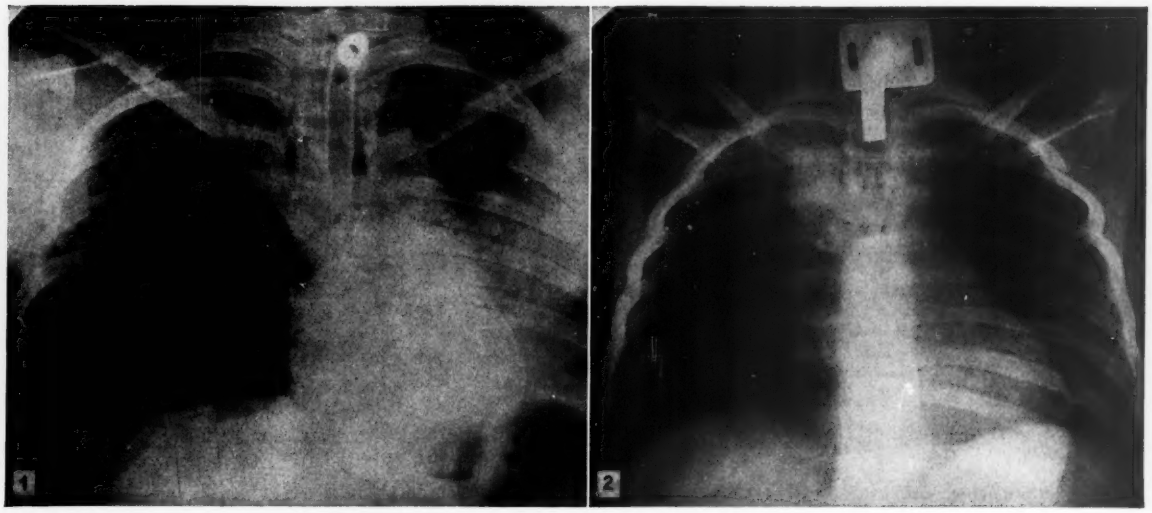
Case I.

A., an aboriginal boy, aged fifteen years, from Yarrabah Mission, Cairns, was admitted to hospital on June 18, 1951, complaining of severe headache, and of pain in the back and the right side of the neck of two weeks' duration. The temperature was normal and the knee jerks were absent. X-ray examniation of the chest revealed a large rounded shadow in the upper lobe of the right lung. He later developed blurred vision, with papilloedema, nystagmus and generalized muscle weakness. The cerebro-spinal fluid was under increased pressure, and cryptococcal organisms were seen in an Indian ink preparation and grown on blood agar. The white cell count was 28,000 per cubic millimetre (89% were neutrophile cells).

Repeated lumbar punctures relieved the headaches. "Atebrin" was given, as Atherton (1951) has shown the organism to be sensitive to this drug *in vitro*. "TAB" vaccine was given by the intravenous drip method in an unsuccessful attempt to maintain an elevated temperature. The patient died two weeks after his admission to hospital.

At autopsy the right lung apex was found to contain a gelatinous mass seven centimetres in diameter. Examination of the brain revealed slight flattening of the convolutions, a slight gelatinous exudate at the base, a few pinhead-sized nodules over the cerebrum, and in the cortex a few gelatinous areas five millimetres in diameter. Histological examination revealed large numbers of encapsulated organisms of *C. neoformans* in the lung and brain.

ILLUSTRATIONS TO THE ARTICLE BY P. M. LAST AND JUDITH NICHOLAS.



ILLUSTRATIONS TO THE ARTICLE BY S. LIVINGSTONE SPENCER AND L. R. FINLAY-JONES.

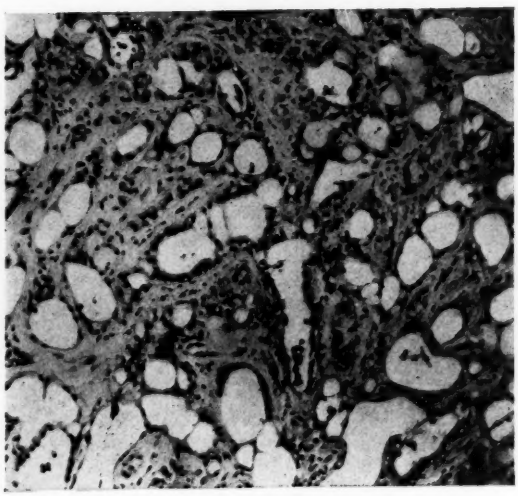


FIGURE I.
Section of the nodule (×120).

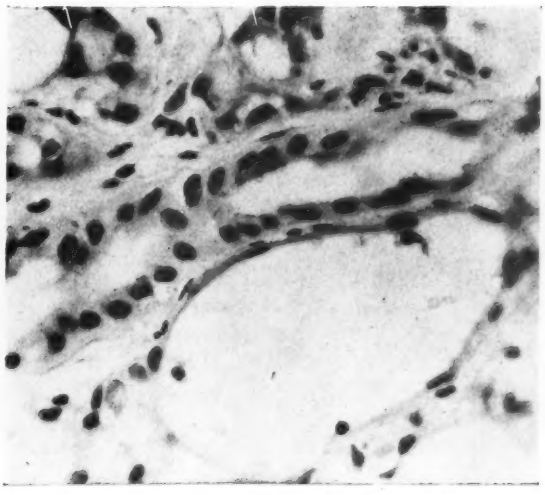


FIGURE II.
Section of the nodule (×480).

ILLUSTRATION TO THE ARTICLE BY THOMAS S. REEVE, M.B., B.S.

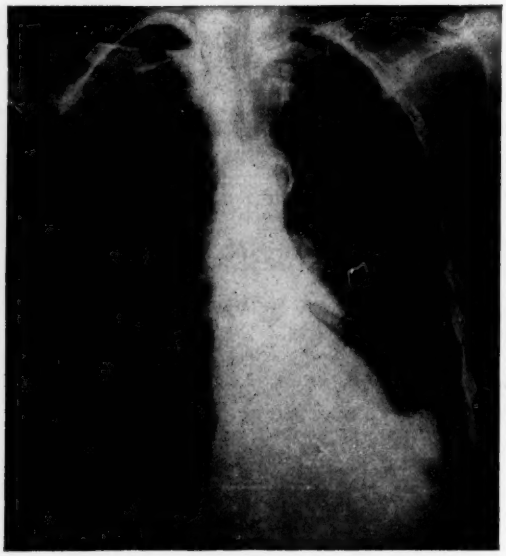
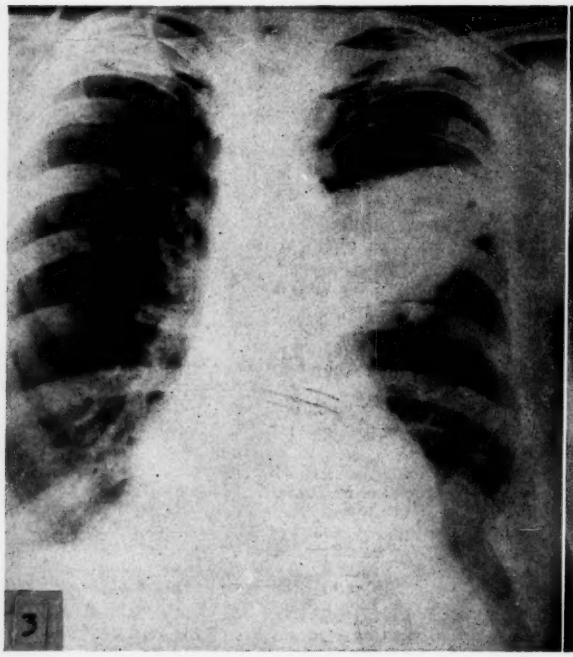
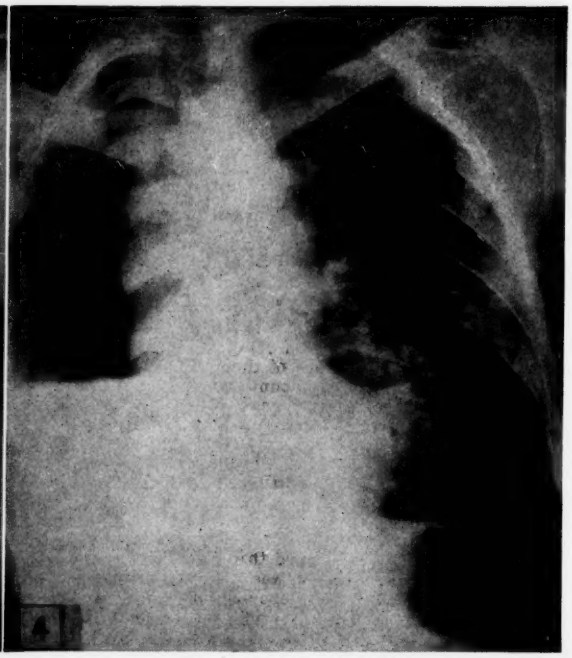


FIGURE I.

X-ray film of the chest taken several hours prior to death showing the presence of hydropneumopericardium, best seen parallel to the left heart border. Atelectasis of the lower lobe of the left lung and pneumonitis involving the lower lobe of the right lung are also evident.

ILLUSTRATIONS TO THE ARTICLE BY B. GEANEY, W. R. HORSFALL AND G. NEILSON.





Case II.

B., a white man, aged twenty-five years, from New Guinea, was admitted to hospital on March 22, 1953, six months after four months' holiday in Queensland, complaining of severe headache and occasional vomiting, of three weeks' duration. The knee and ankle jerks were absent and Kernig's sign was elicited; papilloedema developed later. The cerebro-spinal fluid contained 82 cells per cubic millimetre, and cryptococcal organisms were seen and cultured. The patient died on April 1 in Cairns while en route to Brisbane from Port Moresby. There was no autopsy.

Case III.

C., an aboriginal female patient, aged twenty-seven years, from Yarrabah Mission, Cairns, was admitted to hospital on July 7, 1953. She had had left basal pneumonia and effusion in 1941. She now complained of right frontal headache, generalized aches and pains, and occasional

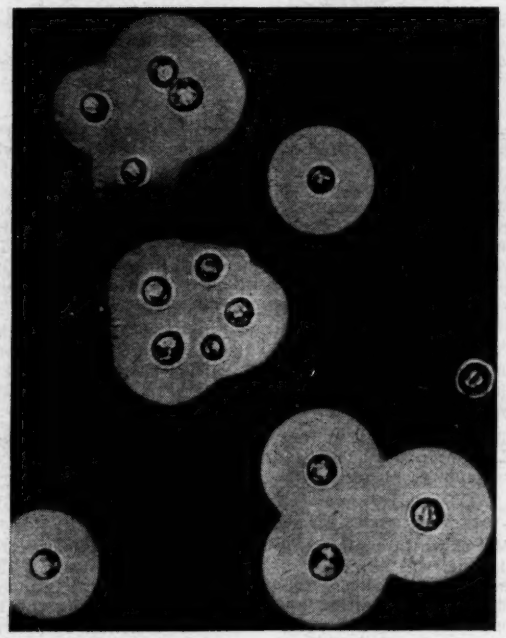


FIGURE II.

Indian ink preparation showing capsules of *Cryptococcus neoformans* from peritoneal fluid of mouse (× 500).

vomiting, over several weeks. While in hospital she had alternate periods of delirium and rationality, but no physical abnormality was discovered. She died four days after her admission to hospital.

At autopsy widespread pleural adhesions were found over the left lung. The middle lobe of the right lung contained a semitranslucent rubbery nodule two centimetres in diameter, and a few smaller ones in the right hilum. There were several small granules one millimetre in diameter in the basal nuclei, and the pituitary stalk was four millimetres in diameter and gelatinous. Cryptococcal organisms were demonstrated in brain and lung on histological examination.

Case IV.

D., a white male patient, aged thirty-one years, resident two and a half years in Cairns, was admitted to hospital on June 5, 1953, with severe headache and slight neck stiffness present for five days. No abnormality was detected clinically apart from neck stiffness and a temperature of 100° F. The cerebro-spinal fluid was turbid, with a white cell count of 600 per cubic millimetre; *C. neoformans* was seen in the centrifuged deposit by the use of an Indian ink preparation, and was grown on culture; an X-ray film of the chest was normal. Leucocytosis was present throughout the illness, the number of cells ranging from 11,000 to 15,000 per cubic millimetre (neutrophile cells 77% to 85%).

From June 14 actidione was given, 20 milligrammes intrathecally and 20 milligrammes intramuscularly per day for nine days, then 40 milligrammes intravenously per day for twenty-one days. For the following twenty-one days 20 milligrammes were given intrathecally on alternate days. "Contramine", in a dose of 0·25 gramme intramuscularly twice a week, was given from June 30 until the patient's death on October 8.

Examination of the cerebro-spinal fluid during treatment showed few organisms, and none could be grown on culture. Cell counts in the early part of the disease ranged from 800 to 1800 per cubic millimetre, falling later to figures as low as 50 per cubic millimetre. The protein content persistently rose, reaching 2·6 grammes *per centum* on August 19. After treatment began the fluid developed a gradually deepening yellow colour, and a fibrin clot formed in later specimens.

At autopsy the lungs were normal, apart from some exudate in the bronchi. The brain was slightly œdematous, with a gelatinous exudate in the circle of Willis and some dilatation of the lateral ventricles. The choroid plexus had a mucoid appearance and contained numerous small and a few larger nodules, up to two centimetres in diameter, rubbery and mucoid on section. There were a few lesions in the brain substance. Cryptococcal organisms were seen on histological examination of the brain lesions.

Case V.

E., a white male subject, aged sixty-one years, resident in Melbourne but on a visit to North Queensland, was admitted to hospital on June 4, 1953, with a recent onset of headache and backache. The white cell count was 15,000 per cubic millimetre (89% neutrophile cells). The cerebro-spinal fluid contained 550 cells per cubic millimetre, and 200 milligrammes *per centum* of protein; an occasional cryptococcal organism was seen in the centrifuged deposit and was cultivated from a later specimen. The patient later returned to Melbourne, and his case has been further reported by G. Buckle and D. R. Curtis (1955).

Case VI.

F., a white female patient, aged sixty years, from Proserpine, was admitted to hospital on January 13, 1954, with severe occipital headache, backache and vomiting, of five weeks' duration. She was drowsy, with generalized muscle hypotonus; knee and ankle jerks were present, and Kernig's sign was "negative". The temperature was 99° F., and X-ray films of the chest and skull revealed no abnormality. The cerebro-spinal fluid contained 30 cells per cubic millimetre, and the protein content was 50 milligrammes *per centum*; cryptococcal organisms were seen in an Indian ink preparation and grown on culture.

Potassium iodide was given in a dosage of 30 grains per day, increasing to 60 grains per day, with sulphadiazine, and "Contramine" (0·25 gramme twice a week). The patient's condition improved initially, but organisms persisted in the cerebro-spinal fluid and she died six weeks after her admission to hospital. There was no autopsy.

Case VII.

G., a white female subject, aged fifty-six years, from western Queensland, was admitted to hospital on December 31, 1952, complaining of pain in the back and in the left side of the chest for several months, and of anorexia, loss of weight and dry cough recently. The breath sounds were diminished over the upper part of the left side of the chest, and X-ray films of the lungs showed a dense mass in the left hilum, extending to the upper lung field, consistent with a hilar carcinoma with atelectasis (Figure III).

Left pneumonectomy on January 16, 1953, revealed a hard, nodular tumour 10 centimetres in diameter in the

left apex, containing numerous small gelatinous nodules, histological examination of which revealed numerous cryptococci. The mediastinal lymph glands were not obviously involved, but histological examination revealed non-specific changes.

The cerebro-spinal fluid a week later appeared normal, and no cryptococcal organisms were detected; an attempted blood culture gave negative results.

The patient was discharged from hospital on February 5 and was still well when last examined thirty months after operation.

Case VIII.

H., an aboriginal male subject, aged forty-four years, from Woorobinda Settlement, Rockhampton, was admitted to hospital on September 25, 1952, with a productive cough present for five weeks, and rigors and malaise lately. Examination of the patient revealed consolidation of the upper lobe of the right lung, and X-ray examination revealed a round opaque area in this region; the left lung appeared normal radiologically. Bronchoscopic examination demonstrated rigidity of the right upper and middle lobe bronchi.

Right pneumonectomy on November 15 showed the upper lobe to be replaced by thick mucoid material containing many loculi of different sizes. *C. neoformans* was demonstrated on histological examination.

The patient's progress was complicated by a cryptococcal infection in the left orbital region following a slight injury there earlier. The organisms were found in the cerebro-spinal fluid, and X-ray examination of the left lung later showed patchy areas of consolidation (Figure IV). The patient died ten weeks after operation.

At autopsy a torula granuloma was found, extending from the left frontal region to the left orbit and paranasal sinuses and forming an exudate over the left cerebral hemisphere. Numerous small lesions were scattered throughout the brain, with a thick exudate at the base. The left lung was extensively involved, with lesions up to six centimetres in diameter, and lesions were also present in the thyroid and kidney.

Case IX.

I., a white male subject, aged fifty-one years, from Brisbane, was admitted to hospital on November 1, 1948, with severe headache and general weakness of five weeks' duration. He was a chronic alcoholic, mentally dull and slurred in speech; no other abnormality was found, but he later developed neck stiffness and papilloedema. The cerebro-spinal fluid was then found to be under pressure, and contained 106 white cells per cubic millimetre and 110 milligrammes *per centum* of protein; no organisms were seen on this occasion, but *C. neoformans* was seen and grown in culture from a second specimen a few days later. X-ray examination of the chest revealed no abnormality, and the white cell count was 8000 per cubic millimetre.

The patient was given 20,000 units of penicillin intrathecally per day. He died three weeks after his admission to hospital. No autopsy was performed.

Case X.

J., a white male subject, aged fifty-two years, from Alpha, western Queensland, was admitted to hospital on April 17, 1950, complaining of severe headache and a little vomiting of three weeks' duration. He had always been mentally subnormal. The tendon reflexes were absent, the plantar reflexes were flexor. The temperature was normal, there was some neck stiffness, and bilateral papilloedema was present. The cerebro-spinal fluid was under increased pressure, and contained 48 white cells per cubic centimetre and 120 milligrammes *per centum* of protein; the colloidal gold reaction was "5533222". *C. neoformans* was seen in a direct smear and grown on culture. An X-ray film of the chest revealed no abnormality.

Twelve grammes of sulphadiazine were given daily. The patient died five weeks after his admission to hospital.

At autopsy the lower lobe of the left lung was found to contain a whitish nodule four centimetres in diameter containing several mucoid globules. There was an exudate over the base of the brain and the leptomeninges were scattered with thickenings and opacities. *C. neoformans* was demonstrated in the lung lesion on histological examination.

Case XI.

K., an aboriginal female patient, aged twenty-nine years, from Casino, New South Wales was admitted to hospital on February 15, 1949, with occipital headache and vomiting, of some weeks' duration. The knee and ankle jerks were absent, there was some neck stiffness, and papilloedema was present. Two days later left hemiparesis developed. The white cell count was 8400 per cubic millimetre; an X-ray film of the chest was normal. The cerebro-spinal fluid contained 650 milligrammes of protein *per centum*, and cryptococcal organisms were seen on direct smear and grown on culture. The patient died seven days after her admission to hospital.

At autopsy there was a large quantity of thick exudate at the base of the brain. The lungs were normal on macroscopic examination.

Case XII.

L., a white male subject, aged forty-five years, from Brisbane, was admitted to hospital on May 25, 1953, with severe headache and some vomiting of five weeks' duration. The patient appeared drowsy, with neck stiffness; the tendon reflexes were absent and papilloedema was present; there was hypotonia in the right arm. An X-ray examination of the chest and skull revealed no abnormality. The cerebro-spinal fluid, under increased pressure, contained 30 white cells per cubic millimetre, and *C. neoformans* was both seen and grown on culture.

"TAB" vaccine was given daily for ten days; then actidione, 20 milligrammes intrathecally with 20 milligrammes intramuscularly, was given daily for ten days, followed by 40 milligrammes intravenously daily for twelve days.

The torula count in the cerebro-spinal fluid fell initially, but later rose. The patient died five weeks after his admission to hospital. There was no autopsy.

Case XIII.

M., a white male subject, aged thirty-two years, from Brisbane, was admitted to hospital on September 11, 1950, complaining of severe retro-orbital and occipital headache, and of some vomiting and loss of weight during the last month. Twenty-five years earlier he had had deep X-ray treatment for Hodgkin's disease of the cervical glands. He had received further deep X-ray treatment in 1944 and 1949, the spleen and liver being enlarged on these occasions. Examination of the patient revealed enlargement of the spleen, and of the cervical, axillary and epitrochlear glands; there was no neck stiffness, and the temperature was normal. After a convulsive seizure a week later, the cerebro-spinal fluid was found to contain 60 white cells per cubic millimetre, and 200 milligrammes *per centum* of protein; *C. neoformans* was seen on a direct smear and grown on culture.

"Atebrin" was given, but the patient's condition became rapidly worse and he died ten days after his admission to hospital.

At autopsy the cervical and axillary lymph nodes were either calcified or brownish in colour, and there were masses of adherent glands along the aorta; the spleen was enlarged and firm. The base of the brain was covered by a thick gelatinous exudate, with a fine film over the cerebrum. Histological examination of the lymph nodes revealed destruction of the normal architecture, the node being replaced by a loose tissue of lymphocytes, with a few reticulum cells and binucleated giant cells, with areas of fibrosis; the appearance was described as a medullary reticulosis of uncertain type. Numerous cryptococci were seen on histological examination of the meninges.

Case XIV.

N., a white male subject, aged thirty-six years, from Murwillumbah, New South Wales, was first examined at the Queensland Radium Institute on May 25, 1954, with generalized lymph node enlargement; his spleen was just palpable. The hæmoglobin value was 12·0 grammes *per centum*, and the white cells numbered 8400 per cubic millimetre (81% neutrophile cells, 12% lymphocytes, 2% monocytes, 3% eosinophile cells and 2% basophile cells). Histological examination of a lymph node revealed atypical Hodgkin's disease, or perhaps lymphoid medullary reticulosis, the normal structure being replaced by lymphocytes and scattered pleomorphic reticulum cells, with multinucleate Reed-Sternberg cells but no fibrosis.

The patient was admitted to hospital on June 20, with vomiting and severe headache of two weeks' duration. A course of nitrogen mustard injections was given. On July 5 he collapsed, and was found to have absent tendon reflexes and papilloedema. The cerebro-spinal fluid, under increased pressure, contained numerous cryptococcal organisms which were successfully cultivated.

The patient died three weeks after his admission to hospital. There was no autopsy.

Discussion.

Cox and Tolhurst (1946) have given a very complete account of both the clinical and the pathological aspects of torulosis. All our cases are very similar to their descriptions. Mosberg and Arnold (1950), besides describing five cases, have also reviewed the 172 reported cases of meningitis. That we have been able to collect 14 cases of torulosis in Queensland in six years confirms the finding of Cox and Tolhurst that this rare disease, though it has a world-wide distribution, is more common in Australia than in most other places. It seems to be widely distributed throughout Queensland. Three patients (Cases I, III and IV) almost certainly acquired their infection in the neighbourhood of Cairns; one patient (Case VI) came from Proserpine, and another (Case VIII) from the Rockhampton district; two patients (Cases VII and X) came from western Queensland; three patients (Cases IX, XII and XIII) came from Brisbane, and two patients (Cases XI and XIV) from northern New South Wales; one patient (Case II) came from New Guinea, though possibly he was infected in southern Queensland; one patient (Case V) was on holiday in Cairns from Melbourne and probably acquired his infection in Victoria. Case II represents the first clinical case described from New Guinea, though Cox and Tolhurst mention that W. T. C. Backhouse's section of a lung from a New Guinea native showed a torula granuloma.

Four of our cases were in aborigines, two coming from the same mission station near Cairns (Cases I and III) and another (Case VIII) from the same aboriginal settlement as a case to be reported by Fullager. Apart from these five cases, the only other aboriginal cases reported are those of Alderman (1949). He described a case from the Northern Territory in a half-caste, and mentions another case in a full-blooded aboriginal. We think it is interesting to note that in Queensland in the period under review a third of the cases have been in aborigines, though the number in the State, including half-castes, is only about 16,000 out of a total population of 1,200,000.

Five of our patients (Cases I, III, VII, VIII and X) had lung lesions. Two types of lung lesion were found—firstly, a single lesion of varying size, and secondly, multiple small lesions throughout the lung showing a tendency to coalesce. Clinical signs were usually minimal. Two patients were diagnosed as having bronchogenic carcinoma, and pneumonectomies were performed, the true diagnosis being made after operation. The patient in Case VII has remained well since the operation, though in view of the chronicity which may be a feature of torulosis the prognosis must still be guarded. Baker (1952) has reported three cases of torulosis of the lungs with apparent cure after resection; two of the patients had been followed up for nine months and one patient for four years. It is interesting to note how quickly torula lung lesions may develop. In Case VIII the patient developed lesions six centimetres in diameter which were not visible on an X-ray film two months before death, and in Case X the patient had a mass almost as large, which was not visible on an X-ray film taken five weeks previously.

The presenting symptoms of torula meningitis are usually severe headache and vomiting, and signs of meningeal irritation are often present. The diagnosis may be missed (as in Case III) because the possibility of torula meningitis is not kept in mind. All our other cases were diagnosed *ante mortem*. We consider that an Indian ink preparation is the most satisfactory means of detecting the cryptococcus in the cerebro-spinal fluid, and examination of the spun deposit is essential. Cases IV and V could both have been missed if this had not been done. It was discovered that a high protein concentration causes aggregation of the ink particles; but if the deposit is washed in saline this is overcome. A high protein level in cerebro-spinal fluid from a patient suffering from tuberculous meningitis suspected of being torulosis also caused this aggregation.

Changes in the brain at autopsy may be minimal (Case I) and can easily be missed unless the diagnosis is kept in mind. In all our patients who came to autopsy cryptococcal organisms have been found in the lesions.

Two of the patients (Cases XIII and XIV) had been regarded as suffering from reticulosis prior to their developing torula meningitis. The patient in Case XIII had been known to have lymphadenopathy for twenty-five years and had been treated with deep X rays. He had had several lymph node biopsies, but the sections were not available for study. The histopathology of the nodes removed at autopsy was that of medullary reticulosis, and despite careful search no organisms could be demonstrated microscopically; no attempt at culture was made.

The histopathological appearance of the lymph nodes in Case XIV was compatible with an atypical form of Hodgkin's disease. Review of the microscopic sections after the patient had developed torula meningitis disclosed in a single discrete fibrous scar refractile structures with some resemblance to *C. neoformans*, although they gave no staining reaction with hæmatoxylin, nor did they possess capsular material. No further investigation was possible, as the slides alone were available. Zimmerman and Rappaport (1954) advance four possible explanations of the association between torulosis and malignant reticuloendothelial disease. These are as follows: (i) The two disease processes are unrelated and the association may be a chance one. (ii) *C. neoformans* may be one of the causative agents of malignant lymphoma. (iii) *C. neoformans* may produce a tissue response which mimics Hodgkin's disease. (iv) Torulosis may occur in patients with Hodgkin's disease only because of lowering of general resistance to infection. The frequency with which the two diseases occur in one patient makes the first hypothesis improbable.

While Cox and Tolhurst (1946) drew attention to the frequency of lymph node involvement in experimental torulosis, in no instance was a histopathological picture resembling Hodgkin's disease produced. Attempts to isolate *C. neoformans* from patients suffering from Hodgkin's disease (Gendel, Ende and Norman, 1950) have in most instances proved unsuccessful. Zimmerman and Rappaport (1954) comment that there is only a superficial resemblance between the microscopic changes produced in tissues by torulosis and those changes resulting from Hodgkin's disease. Thus there is no conclusive evidence that Hodgkin's disease may be caused by *C. neoformans* or that this organism may evoke a tissue response similar to that seen in Hodgkin's disease. However, in most of the reported cases of torulosis associated with Hodgkin's disease, including our own, histological examination of the enlarged glands does not reveal the classical picture of Hodgkin's disease.

The frequency with which patients suffering from Hodgkin's disease develop tuberculosis has long been recognized. Dubin (1947) demonstrated a deficient immunological response in patients with Hodgkin's disease, and concluded that this was responsible for the increased tendency of

these patients to develop infections. In addition, *C. neoformans* has been shown to lead a saprophytic existence in the soil. It is possible that this mechanism is responsible for the frequency with which these patients develop torulosis.

Various forms of treatment have been used. No treatment of value for the meningitis has been found. Actidione was given in three cases without appreciable effect, though the dose was similar to that used by Wilson and Duryea (1951) in their case. A cure following treatment with actidione is also to be reported by Fullager. Carton (1952) has reviewed ten patients treated with actidione and has treated three patients. He came to the conclusion that actidione was not very effective. "Contramine" and "Atebrin" have both been shown to have an effect *in vitro*, but we could detect no response *in vivo*. Fever therapy ("T.A.B." vaccine given intravenously) was attempted in Cases I and XII, as Kuhn (1949) and Kligman, Crane, and Norris (1951) have shown that the organism is very sensitive to heat, and from their experiments it would appear that a temperature of about 105° F. for about eight days should kill the cryptococcus. A lower fever combined with chemotherapy may be a valuable form of treatment. It is possible that the failure to respond to treatment is due to the insidious onset of the disease, with the consequent delay in diagnosis. Early diagnosis and treatment may explain the few reported cures. The treatment of choice is resection if a solitary lung tumour only is present. This appears to have been successful in one of our cases, but in the other case dissemination must have already taken place.

Summary.

1. Fourteen cases of torulosis are described.

2. Thirteen of the patients had central nervous system involvement and five had involvement of the lungs. Two patients had previously suffered from a reticulosis. The findings are discussed.

Acknowledgements.

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Legends to Illustrations.

FIGURE III.—X-ray film of chest (Case VII) showing an opacity extending laterally from the left hilum.

FIGURE IV.—X-ray film of chest (Case VIII) showing multiple miliary shadows in the left lung field.

Reviews.

A Textbook of Medicine, edited by Russell L. Cecil, M.D., Sc.D., Robert F. Loeb, M.D., Sc.D., D.Hon.Causa, LL.D.; associate editors, Alexander B. Gutman, M.D., Ph.D., Walsh McDermott, M.D., and Harold G. Wolff, M.D.; Ninth Edition; 1955. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 10" × 7", pp. 1820, with 201 illustrations. Price: £7 10s.

THIS book, first published in 1927, is now appearing in its ninth edition. The two editors are assisted by three associate editors, and the number of contributors has been increased to 172. A number of new articles are included in the new edition dealing with some of the "new" infectious diseases, some diseases of metabolism and other miscellaneous diseases. Amongst these new subjects is a welcome and very good discussion on dehydration and fluid balance.

The first section of the book deals with diseases from the etiological standpoint and the remainder of the book discusses diseases under the various systems.

The text of the book covers every reasonable aspect of medicine, and as a reference book one can be sure that the information sought is contained therein. Most diseases are considered in detail and a useful list of references is given after each article. There is a tendency to over-emphasize the laboratory investigations of disease at the expense of the clinical features. The subject matter, particularly in treatment, is absolutely up to date.

As has been stated, this "Textbook of Medicine" is ideal for reference by consultants, general practitioners and medical students alike. However, we consider that it is not a book from which medical undergraduates should learn their theoretical medicine. That there are so many contributors means that closely related diseases are often discussed by two different authorities, and in some respects there may be differences of opinion regarding similar diseases. It is a pity from this point of view that the parts of the book dealing with medicine by systems have not been written by a much smaller number of contributors.

In spite of this criticism, we think that this "Textbook of Medicine" will still remain one of the main reference books, and the editors and publishers are to be congratulated on producing a new edition with so much new material and one which is remarkably up to date.

Modern Treatment Year Book 1956: A Year Book of Diagnosis and Treatment for the General Practitioner, edited by Sir Cecil Wakeley, Bt., K.B.E., C.B., LL.D., M.Ch., D.Sc., F.R.C.S., F.R.S.E., F.R.S.A., F.A.C.S., F.R.A.C.S.; 1956. London: Published for the Medical Press by Baillière, Tindall and Cox, Limited. 8¼" × 5¼", pp. 352, with illustrations. Price: 25s.

THE object of this year book is to keep the practising medical man informed on the practical application of the latest research. It contains a wide selection of articles, 37 in the present case, ranging over the whole field of medicine and surgery; the author of each article is an authority in his own field. Some indication of the ground covered in the present volume is given by the fact that articles are included on biliary obstruction and its treatment, the management of common athletic injuries, barbiturate poisoning, *acne vulgaris*, pink disease, hydatid disease of the liver, acute virus hepatitis, the care of children's eyes, *otitis externa*, the treatment of depression, the place of

orthopædics in the treatment of poliomyelitis and modern views on malaria. The status of the authors of the individual articles is in itself sufficient guarantee of the practical worth of this book.

The Year Book of Pediatrics (1955-1956 Series), edited by Sydney S. Gellis, M.D., 1955. Chicago: The Year Book Publishers, Incorporated. 7" × 5", pp. 431, with illustrations.

THE editor of this particular Year Book has an interesting policy with regard to editorial comments on individual abstracts. In many cases he makes his own comment, but quite often he has invited the comment of someone else with special knowledge of the subject matter. Occasionally an opposing opinion is presented, which is very stimulating, if not acceptable to those who like their medical teachings to be dogmatic. The scope of the Year Book is naturally wide, and sections are devoted to the premature and the newborn, nutrition and metabolism, infectious disease and immunity (with special attention to poliomyelitis, and to tuberculosis), allergy, dentistry and oto-laryngology, ophthalmology, the respiratory, gastro-intestinal and genito-urinary tracts, the heart and blood vessels, the blood, endocrinology, orthopædics, dermatology, neurology and psychiatry, tumours, therapeutics and toxicology, and miscellaneous subjects. The material included, which has been drawn from a wide field of general and pædiatric literature, will be acceptable to pædiatricians and general practitioners and to others whose practice brings them into contact with children.

Methods of Biochemical Analysis, edited by David Glick; 1955. New York: Interscience Publishers, Incorporated. London: Interscience Publishers, Limited. Volume II. 9" × 6¼", pp. 476, with 46 illustrations. Price: $9.50.

THE second volume of this invaluable series contains authoritative articles on the undermentioned analytical topics: analysis of steroids by infra-red spectrometry; chemical determination of adrenaline and nor-adrenaline in body fluids and tissues; lipide analysis; measurement of lipoxidase activity; assay of compounds with folic acid activity; determination of vitamin *E*; determination of coenzyme *A*; assay of proteolytic enzymes; determination of glutathione; determination of serum glycoproteins; new colour reactions for the determination of sugars in polysaccharides; recent developments in techniques for terminal and sequence studies in peptides and proteins; spectrophotometric assay of cytochrome with oxidase.

The selection of experienced workers with the appropriate special skills for each article is very good. The range and depth of treatment of the available information are admirable. For best use a book of this kind needs good indexing. This has been provided and in addition there is a cumulative index of both subjects and authors. This series has established itself as an almost indispensable laboratory guide where biochemical investigation is carried out.

Childbirth. By W. C. W. Nixon, M.D., F.R.C.S., F.R.C.O.G.; 1955. Modern Health Series. London: Gerald Duckworth and Company, Limited. 7¼" × 5", pp. 106. Price: 8s. 6d.

Diabetes. By G. F. Walker, M.D., D.C.H., M.R.C.P.; 1955. Modern Health Series. London: Gerald Duckworth and Company, Limited. 7¼" × 5", pp. 96. Price: 8s. 6d.

Cancer and Allied Diseases. By Ronald W. Raven, O.B.E., T.D., F.R.C.S.; 1955. Modern Health Series. London: Gerald Duckworth and Company, Limited. 7¼" × 5", pp. 106. Price: 8s. 6d.

THE three latest topics added to the Modern Health Series are entitled "Childbirth", "Diabetes" and "Cancer"; this brings the total number of volumes in it up to nine.

"Childbirth", by Professor W. C. W. Nixon, who is Professor of Obstetrics at London University, gives expectant mothers a practical guide that will fully prepare them for motherhood. By explaining plain facts simply but completely, the author banishes the many half-truths and old wives' tales with which well-intentioned friends and relatives often frighten mothers-to-be. Pre-natal and post-natal care is discussed together with the necessary exercises, and the important subject of diet is also covered. All mothers and even fathers-to-be can read this book confidently, for from it they will learn much that will fit them for the wonderful privilege of parenthood.

In "Diabetes" Dr. G. F. Walker has succeeded very happily in turning the complex story of *diabetes mellitus* into simple everyday language that can be readily assimilated by patients of average intelligence; to overcome his illness, it is essential for every diabetic to take an intelligent interest in it. The author explains that tendency to diabetes is inherited, and goes on to enumerate the precautions that anyone in a diabetic family should take. He details the various aspects of treatment as regards both diet and insulin and lists the complications that have to be prevented from developing. Chapters on diabetic children, heredity and marriage and work and recreation are included, and an appendix gives details of diabetic associations throughout the world, as well as instructions for different methods of urine testing and the make-up of basic diets. This book can be recommended by doctors as a useful guide for their diabetic patients.

The difficult task of writing on cancer for lay readers has been undertaken by Dr. Ronald W. Raven, and perusal of this practical little book will do much to allay the dread of cancer, from which so many people suffer. After explaining what cancer is, the author goes on to enumerate the symptoms and signs, and he places due emphasis on the necessity for not delaying in consulting the doctor should any of these persist. Then he discusses the different organs that may be affected. The second part of the book deals with all forms of therapy, whether by surgery or by physical aids or hormones. Rehabilitation is also discussed and the care of patients with persistent disease. All laymen could derive much benefit and educate themselves about cancer by reading this volume.

The late Lord Horder originated this series, and as it grows it provides a fitting set of volumes that will be just one more memorial to him.

The Year Book of Urology (1955-1956 Year Book Series). Edited by William Wallace Scott, M.D., Ph.D.; 1956. Chicago: The Year Book Publishers, Incorporated. 5" × 7½", pp. 398, with many illustrations. Price: $6.50.

THIS year book follows the same pattern as its predecessors; it comprises abstracts of articles of urological interest from medical journals received between November, 1954, and October, 1955. The usual opening section on general considerations has a new subsection on anæsthesia. In the section on the kidney, the subjects covered are the same as in the previous volume, with the interesting exceptions that the subsection on tuberculosis has been dropped and a subsection on surgical technique has been added. Matters considered in the section on the adrenals are Cushing's syndrome, adrenogenital syndrome and cortical tumours, medullary tumours, adrenalectomy for hypertension and cancer, and miscellaneous clinical and experimental procedures. The section on the ureter covers the same subsections as in the previous volume. The bladder is dealt with under the headings of tumours, micturition, surgical technique and miscellaneous matters. In the section on the prostate, a subsection on choice of operation has been added and that on calculi has been dropped. The final section deals with the genitalia, and with slight rearrangement and amplification much the same ground is covered as before. The editor's short but pithy comments scattered throughout the book add to its interest and value. This Year Book, like earlier editions, will be a profitable work of reference for all who wish to keep themselves up to date with urological practice.

Thallium Poisoning. By J. J. Prick, W. G. Sillevis Smitt and L. Muller; 1955. Amsterdam, Houston, London, New York: Elsevier Publishing Company. London: Distributors, Cleaver-Hume Press, Limited. 9" × 6", pp. 164, with 21 illustrations. Price: 19s.

THIS small volume written by two neurologists and an industrial physician from Holland is of interest to all physicians in this country, particularly neurologists and those interested in forensic medicine, by whom it should be carefully perused. The book reviews fairly comprehensively the literature on thallium poisoning, and integrates this with the experience of the authors in the case of eight patients studied intensively. It includes some thorough and well-illustrated neuropathological studies and concludes with notes on the toxicology of thallium. The book is well set out and illustrated, but is marred by curious translation. It is, however, easy to read.

As in this country, interest was stimulated by a series of murders and attempted murders which in Holland took place in a wartime factory. The authors' case histories make fascinating reading, particularly that of a patient who administered thallium to himself in small doses from the age of eight years and the cause of whose polyneuritis was not correctly diagnosed until he had reached the age of thirty-three years. The symptomatology as outlined by the

authors is largely as has been seen and recorded in this country. The authors describe well the appearances outside the nervous system, particularly those in the skin and nails, the glossitis, stomatitis and achlorhydria. They point out that thallium may interfere with vitamin B_1 metabolism.

In several of their patients the glucose tolerance resembled that in *diabetes mellitus* and there was glycosuria. As they indicate, this may result either from pancreatic lesions or, together with inversion of the sleep rhythm, *diabetes insipidus* or Korsakow's psychosis, all of which are recorded by them, from observed lesions in the diencephalon and reticular formation.

Though lesions in the peripheral nervous system were dominant, degenerative changes were seen in the whole length of the nervous system. They estimated the minimum lethal dose as 0·8 gramme of thallium for an adult which is in accord with views in this country. The section on treatment is rather disappointing, but this is a small criticism.

The book can be recommended to a large number of medical practitioners in this country.

An Introduction to Pool Exercises. By Elizabeth Bolton, M.C.S.P., H.T., and Diana Goodwin, M.C.S.P., H.T., with a foreword by J. W. T. Patterson, M.D., F.R.C.P.Ed.; 1956. London: E. and S. Livingstone, Limited. 8½" × 5½", pp. 48, with illustrations. Price: 5s.

THE importance of remedial training and exercises in the swimming pool for all types of locomotor disabilities is now generally recognized. Elizabeth Bolton and Diana Goodwin have now produced a booklet setting out the principles of such treatment, and they state in the preface that the book is meant "as a guide to the novice in Pool Therapy". In this regard it is indeed a complete guide not only for the novice, but for more senior physiotherapists who will also find it invaluable.

A brief opening chapter on physics discusses the Archimedes principle, the moment of force, viscosity, hydrostatic pressure and motion through a liquid, and shows how the various physical properties are adapted therapeutically. The advantages of pool therapy are enumerated, too, and then a complete series of exercises for all the muscular systems is given together with details for caring for the patient and a listing of the items of apparatus required. The graphic illustrations make the text easy to follow. The work concludes with musical settings which show how to obtain the correct rhythms when teaching the crawl, backcrawl or breaststroke.

A Hundred Years of Nursing at St. Mary's Hospital, Paddington. By Sir Zachary Cope; 1955. London: William Heinemann (Medical Books), Limited. 7¼" × 5", pp. 152, with illustrations. Price: 10s. 6d.

AN addition to the many purely medical subjects upon which Sir Zachary Cope has written is "A Hundred Years of Nursing", which tells of the development of modern nursing as seen at St. Mary's Hospital, Paddington. The close friendship between Florence Nightingale and the second matron of the hospital led "the Lady of the Lamp" to take a close personal interest in nursing there, and her influence undoubtedly played a large part in the growth of nursing from a menial task to the full profession of today. The hospital honoured Florence Nightingale by making her a governor in 1856, and she remained one until her death in 1910, although, strangely enough, no record can attest to her ever having attended a board meeting.

The various epochs of the hospital are traced matron by matron and due tribute is paid to the other less prominent but no less essential members of the nursing staff. Sir Zachary Cope has delved into the archives of the hospital, various libraries and the British Museum for authoritative facts, and has presented them in a way which makes interesting reading for all associated with modern nursing.

First Studies in Anatomy and Physiology. By John Cairney, D.Sc., M.D., F.R.A.C.S., and John Cairney, B.Sc., M.B., Ch.B.; 1956. Christchurch, New Zealand: N. M. Peryer, Limited. 7¼" × 4¾", pp. 230, with 103 illustrations. Price: 30s.

ACCORDING to the preface, "First Studies in Anatomy and Physiology" has been written with a dual purpose—first, for nurses doing their preliminary training courses, and secondly, for maternity nurse trainees who are not already registered nurses. In books of this kind the authors' main difficulty is to know just how much detail to include or to omit, and certainly this volume errs on the meagre side, giving only the very elementary details of the subjects. As in the larger work by one of the two authors of this book, the various bodily systems are dealt with chapter by chapter, and the anatomy and physiology of each system are linked together in such a way as to treat anatomy dynamically, which from a nurse's angle is admirable as her patients are living entities. In the 196 pages, there are 103 drawings, all of which are clear but free from intricate details, and these all add to the clarity of the text.

It is hard to evaluate this work critically, and its worth will be proved by the popularity it achieves in the eyes of tutor sisters and doctors who give nurses their first lectures on the structure and function of the human frame. It is another publication of the progressive house of Peryer, of Christchurch, New Zealand.

Books Received.

[*The mention of a book in this column does not imply that no review will appear in a subsequent issue.*]

"Original Good", by Macpherson Lawrie; 1956. Ashingdon, Rochford, Essex, England: The C. W. Daniel Company, Limited. 7¼" × 5", pp. 92. Price: 6s.

Part of a quotation at the beginning of the book reads: "There is nothing evil—or slothful—born into the heart of man."

"Sir John Bland-Sutton, 1855-1936", by W. R. Bett, M.R.C.S. (England); foreword by Lord Webb-Johnson; 1956. Edinburgh and London: E. and S. Livingstone, Limited. 8½" × 6½", pp. 108, with illustrations. Price: 20s.

The author, according to the "foreword", has written a "faithful story".

"Medical Parasitology: For Medical Students and Practising Physicians", by William G. Sawitz, M.D.; Second Edition; 1956. New York, Toronto, London: McGraw-Hill Book Company, Incorporated. 9" × 6", pp. 351, with illustrations.

The subject is presented from the medical point of view.

"Elements of Healthful Living", by Harold S. Diehl, M.A., M.D., Sc.D.; Third Edition; 1955. New York, Toronto, London: McGraw-Hill Book Company, Incorporated. 9" × 6", pp. 368, with illustrations.

Intended to be an aid to "college men and women to meet their personal and civic responsibilities in the field of health".

"Medical Research: A Midcentury Survey." Volume I: "American Medical Research: In Principle and Practice"; Volume II: "Unsolved Clinical Problems: In Biological Perspective". Published for The American Foundation, New York and Westbrook, Connecticut, by Little, Brown and Company, Boston and Toronto; 1955. London: J. and A. Churchill, Limited. 9" × 6", pp. 772. Price: £5 5s.

Two widely acclaimed volumes whose objects are implicit in their title.

"The Biliary Tract: With Special Reference to the Common Bile Duct", by Julian A. Sterling, A.B., M.D., M.Med.Sc., Sc.D., F.A.C.S.; 1955. London: Baillière, Tindall and Cox. 6" × 9", pp. 433, with illustrations. Price: 80s.

The object is "to correlate clinical features, laboratory investigations, operative procedure and biliary functions for the benefit of the gastroenterologist, the general practitioner, the surgeon and the investigator".

"Atlas of Tumor Pathology" (Washington: Armed Forces Institute of Pathology). Section III—Fascicle 7: "Tumors of the Cardiovascular System", by Benjamin H. Landing, M.D., and Sidney Farber, M.D.; 1956. 10½" × 8", pp. 138, with 138 illustrations. Price: $1.50. Section V—Fascicle 19: "Tumors of the Thymus Gland", by Benjamin Castleman, M.D.; 1955. 10½" × 8", pp. 82, with 85 illustrations. Price: $1.00. Section IX—Fascicle 33: "Tumors of the Female Sex Organs." Part I: "Hydatidiform Mole and Choriocarcinoma", by Arther T. Hertig, M.D., and Hazel Mansell, M.B., B.S.; 1956. 10½" × 8", pp. 63, with 65 illustrations. Price: $1.00.

Earlier fascicles of this atlas have been received and noted. The Armed Forces Institute of Pathology acts under the auspices of the Subcommittee on Oncology of the Committee on Pathology of the Division of Medical Sciences of the National Academy of Sciences—National Research Council.

The Medical Journal of Australia

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

SURGEONS AND TRADITION.

SHYLOCK speaks for the down-trodden in every age: "Hath not a Jew eyes? hath not a Jew hands, organs, dimensions, senses, affections, passions? fed with the same food, hurt with the same weapons . . . ?" With little change the plaint fits many situations; and there are not wanting those who are ready to utter it. Even the surgeons, it seems, have been put upon—ranked lower than the physicians, to be precise—and Sir Russell Brock has felt the call to play the surgeons' Shylock: "We are conceived in the same way, born in the same way, eat the same food, drink the same drink, go to the same schools and colleges, attend the same medical schools and the same clinical instruction and graduate in the same way." Then whence and where, he asks, derives the subtle difference between the two? The only conclusion he can reach is that "it is something in the very nature or atmosphere of the Royal College of Physicians; perhaps a cloud of some special canonizing dust falls upon its habitués".

The occasion of Sir Russell Brock's spirited and wholly good-natured revolt against the professional *status quo* was an after-dinner speech during the Henry Ford Hospital International Symposium on Cardiovascular Surgery held at Detroit in March of last year.[1] He was, as he said, preaching to the converted; for those taking part in the symposium recognized and put into effect proper cooperation between physician and surgeon. This is amply substantiated by a perusal of the report of the proceedings of the symposium. Here we find a dazzling array of physicians and surgeons from many parts of the world collaborating to present and evaluate the place of surgery in cardiology today. They consider in turn diagnostic techniques, pulmonic stenosis, adjustments between the systemic and pulmonary circulations, the evaluation of transposition operations, mitral stenosis and mitral insufficiency, aortic stenosis and aortic insufficiency, septal defects, cardiac arrest, hypothermia, and aneurysms and occlusive diseases of the aorta. Detailed comment on the material presented is neither practicable nor necessary here. It is sufficient to say that the volume contains a full consideration of many of the remarkable advances that have quite literally given new heart to many cardiac invalids, and will repay the attention of all who are interested. Moreover, it shows the surgeon assuming a major, even a dominating, role in an important part of cardiology, a field that once was the physician's special preserve. Here at least, as Sir Russell Brock says, the physician and the surgeon now stand on an equal footing.

Some indeed suggest that over a much wider field the pendulum has swung even further, and they describe the consultant physicians as the "new poor" of the medical world. The contention is that the general practitioner now has so many effective drugs at his disposal, especially for the treatment of acutely ill patients, that he seldom thinks of calling in the physician to advise him or stand behind him when his patients have the pneumonia or meningitis or (a few years earlier) pernicious anæmia that would once have threatened them with death. On the other hand, the surgeon has invaded the thoracic, cardiac, neurological and other fields to such effect that often he likes to attend himself to much of the diagnosis and general management as well as to the operative surgery that once was practically his delimited territory. By the time the patients regarded as having psychosomatic disorders are packed off to the psychiatrist, the physician is left with a handful of patients presenting insoluble diagnostic problems and untreatable chronic complaints, none of which are likely to lend lustre to his reputation or fatness to his pocket book. This is, no doubt, a grossly exaggerated picture, but it throws into relief the position in the latter part of the eighteenth century, when (as Sir Russell Brock describes it) the physician was alone likely to be a trained scientist with a university degree and the ability to think for himself, and the surgeon was, in general, an ignorant fellow, a pure follower of a craft and with little or no power of original thought. The Royal College of Physicians was ancient and honourable; the Barber-Surgeons Company had not long since divided, to end what had become an intolerable association, and the Surgeons Company was not yet become the Royal College of Surgeons. John Hunter was building the foundations of modern scientific surgery, but not till the nineteenth century was its superstructure to arise; and the surgeon was frankly a lower form of life than the physician. Sir Russell Brock points out that the perpetuation of this position in the face of significant changes may well be the result of the strength of English tradition. As a nice example of this sort of thing he tells the story of the "Bank Guard", a detachment of Her Majesty's Foot Guards in full uniform with fixed bayonets and with an officer at their head with drawn sword, which marches through London every evening to the Bank of England.

[1] "Cardiovascular Surgery: Studies in Physiology, Diagnosis and Techniques", Proceedings of the Symposium held at Henry Ford Hospital, Detroit, Michigan, March, 1955, edited by Conrad R. Lam, M.D.; 1955. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 10" × 6½", pp. 572, with many illustrations. Price: £6 7s. 6d.

In 1780 during the Gordon Riots, a detachment of Guards was ordered to go and guard the Bank, which was threatened by the mob, and apparently no one has remembered to cancel the order that they should do this every night. Now, of course, as Sir Russell Brock points out, if anyone tried to stop the practice, it would probably lead to another riot. Obviously then we must not too precipitately upset the balance of Nature as it is seen in the traditional status of physician and surgeon. The surgeons themselves are, of course, seeing to this in one quite curious way, brought to our notice by this distinguished English surgeon. In the bad old days the surgeon seldom if ever sported the M.D. of the physicians and so had to be content with the common address of "Mr.". The modern surgeon clings to this sign of former inferiority, esteeming it a distinction from the common run of "Drs."; and in Australia, never noted for its conservatism or worship of tradition, the practice is growing. Thus we find that in this important section of the profession, which is thrusting its roots deep into the basic sciences, spreading its branches widely into new diagnostic responsibilities and putting out brilliant blossoms of operative achievement, its members are indistinguishable in an account of a scientific meeting from the technicians of the ancillary sciences who do their bidding. It is a quaint custom, but no quainter than (for example) the wearing of buttons in odd places on a man's coat in formal and informal wear. All the best people, even consultant physicians, do this. It reminds one inevitably of the row of brass buttons on a midshipman's sleeve, which are a perpetual reminder of why he was and still is called a "snottie". He takes joy in the name. We are all creatures of tradition.

Current Comment.

CHLORPROMAZINE IN CHILDHOOD.

THE use of chlorpromazine in the treatment of various severe psychiatric disorders has evoked considerable interest in the past two years. Opinion has varied greatly on such matters as the correct dosage, the effectiveness, and the side effects of treatment. However, it is generally accepted that chlorpromazine is highly useful for some patients who have proved resistant to the older forms of therapy. Moreover, chlorpromazine is relatively safe and the complications of its use are usually mild and transient. Chlorpromazine and its allied drugs appear to produce a relaxation of mental tensions, so that the abnormal pathways of the aberrated mental process are no longer used in the response to environmental stress. Reports of the use of chlorpromazine in the severe emotional disorders of children have been strictly limited.

R. L. Gatski[1] used the drug in the treatment of nine boys of the aggressive, delinquent and destructive type who had previously proved resistant to other forms of therapy. These boys, who were aged from six to thirteen years, received, after gradual increase in the dosage, 40 milligrammes of chlorpromazine in four divided doses daily. In some children this dosage was eventually doubled. During the treatment all the boys became more reasonable and amenable and better adjusted. Relapse occurred when a placebo was substituted for chlorpromazine. A large trial of the effectiveness of chlorpromazine in emotionally disordered children has been made by B. R. Hunt, T. Frank and T. P. Krush.[2] Of the 58 patients used in the study three groups were formed. One group received chlorpromazine throughout the month of observation and each of the other groups received either chlorpromazine or a placebo first, and the type of medication was reversed after a month. The children proved to be highly suggestible as to the possible nature of the new drug, though by the end of the first week it was accepted as part of the hospital routine. The initial dosages were 75 milligrammes per day for those under the age of twelve years and 150 milligrammes per day for older or more disturbed children. Initially most of the children complained of somnolence, and the individual response was otherwise very variable, as was also the individual tolerance. Children complained of dizziness and sensations of unreality. Hunt *et alii* estimated an improvement as slight, mild, moderate or extensive, according to the original condition of the patient and not according to the amount of improvement needed to achieve normality. Of 17 children with chronic schizophrenia, one improved extensively and 15 slightly to moderately. The most apparent improvement was in the psychomotor activity so that hyperactivity was controlled, the barrier of isolation and withdrawal was overcome, and the children became increasingly aware of themselves and improved their social integration. In several of these chronic schizoid children the improvement appeared to be directly proportional to the adequacy of adjustment during the first three months of life. Of six children with less pronounced schizoid tendencies, four were improved by chlorpromazine. Of three older children with acute schizophrenia, two were extensively, and the third moderately, improved, and the authors comment that in these children the introduction of chlorpromazine was followed by a striking disappearance of hallucinations and delusions.

In the treatment of 16 children with behaviour disorders the results with chlorpromazine were less conclusive, and improvement when it occurred was one of reduction in hyperactivity and aggression with a better social integration, though with a tendency to depression in several of the children. Likewise in a group of nine delinquent children the response was variable; three were considerably improved and three became worse. Again, improvement when it occurred was related to the reduction in hyperactivity, impulsiveness and aggressiveness; particularly troublesome in this group was depression, which the authors consider arose in children whose abnormal behaviour had been the "acting out" which had resulted from an attempt to solve and to tolerate internal tension. In the treatment of seven children with brain damage of some kind, chlorpromazine had a very limited usefulness in the reduction of hyperactivity.

In the whole series, complications consisted of one transient urticarial reaction and three cases of tissue œdema. Paradoxically, in two epileptic children the number of seizures was increased so that more sedation was required. About 10% of the patients on high dosages of chlorpromazine developed mild Parkinsonism, which rapidly disappeared when the drug was withdrawn. In no patient did jaundice occur. From this series it would appear that chlorpromazine is of particular value in the reduction of the hyperactivity of behaviour disorders and in the schizoid illness of short duration. On a hypothetical basis it may be suggested that chlorpromazine straightens the latent healthy functions of the ego, though this may occur owing primarily to action on the reticular activating system.

[1] *J.A.M.A.*, April 9, 1955.
[2] *Am. J. Dis. Child.*, March, 1956.

FREEZING CORNEAL GRAFTS.

SINCE the introduction of corneal grafting by homograft transplants the difficulties encountered have in the main been technical. The success of the procedure is almost surprising, considering the delicacy of the particular structure and the solid difficulties experienced in other fields of transplant homografts. The particular difficulty with corneal grafting lies in the supply of suitable corneal material at the time when it is needed. The sole source of the graft is that of man shortly after death has occurred. Each graft must be obtained shortly before the operation,

and as storage has not been possible for more then a few days, the building up of reserve stocks of corneal tissue has proved impossible. In the absence of any practicable means of keeping such tissues alive and healthy under artificially provided physiological conditions, there remains only one possible method of preserving corneal tissue over long periods, and this is by freezing. Various attempts have been made to obtain viable grafts after freezing. Animal experiments have used corneal tissue frozen rapidly in liquid nitrogen and dried over phosphorus pentoxide at −40° C. with reconstitution after storage in isotonic saline solution. In most of the experiments the grafts were viable, but there was no lasting transparency. H. H. G. Eastcott, A. G. Cross, A. G. Leigh and D. P. North[1] devised a method of taking a lamella of cornea from the cadaver eye *in situ*. The grafts were placed in a 15% solution of glycerol in Ringer's saline, and after standing for one hour at room temperature the whole was immersed in a mixture of carbon dioxide and alcohol at a temperature of −79° C., and subsequently stored at this temperature in a deep freeze surrounded by solid carbon dioxide. The grafts were stored for varying times up to nine months. Thawing was by immersion in water at 40° C. and the graft was applied to the recipient after being soaked in a solution of saline with penicillin. In the 12 patients treated, three of the grafts were lamellar and seven were of full thickness. All the lamellar grafts remained clear and healthy; in some of the full-thickness grafts permanent opacity ensued. From this it appeared that at least lamellar corneal grafts could be stored for long periods and possibly indefinitely. An interesting point raised was the actual fate of the graft, and it seemed not unlikely that the donor tissue remained alive and was not replaced by that of the host.

C. E. Iliff, R. M. Wood and D. H. Hollander[2] have found that the cornea of the rabbit when frozen in normal saline solution shows, after thawing, narrowing of the epithelial layer and distortion of the individual nuclei as though the tissue had been crushed. This epithelial damage was not found when glycerol was added to the solution before freezing. By demonstration of dehydrogenase activity in the tissue after freezing it was shown that the cornea was killed by the pure saline freezing, but remained viable when frozen in the saline solution of glycerol. Iliff *et alii* transplanted a full thickness cornea frozen in the manner described by Eastcott *et alii*, and the graft has remained clear with normal function for seventeen months to date.

S. D. McPherson, J. W. Draheim, J. Evans and W. R. Earle[3] have attempted to show whether corneas frozen in glycerol solution are truly viable. The experiments were performed upon the corneas of newly killed rabbits. The corneal tissue was divided into three groups. The first group of tissues was incubated at 37·5° C. with horse serum culture medium. The second group was treated in the same way after being soaked for one hour in a 15% solution of glycerol in buffered saline. The tissues in the third group were frozen in the glycerol solution and stored for one hour at −79° C. Apart from the brevity of storage, it can be seen that the method used was similar to that employed in the successful series of Eastcott *et alii*. The experimental corneas were subsequently thawed and cultivated in the same way as the other two groups. Within a few hours cellular proliferation began from the untreated corneas, and by the end of forty-eight hours migration of living cells was well under way in all the specimens, however treated. A later experiment revealed that of corneas frozen unprotected by glycerol, only half remained viable, and these had evidence of cell damage and reduced activity. This susceptibility of corneal tissue unprotected by glycerol when frozen was confirmed in a larger series of cultivated corneas. In viable tissue there was first migration of epithelial cells followed by migration of spindle cells resembling corneal stromal cells. The authors remind us that the mechanism by which glycerol protects the freezing cell may be by the prevention of intracellular ice crystal formation or by providing a buffer against sudden changes in electrolyte concentration. However, the technique of freezing corneal tissue in glycerol for the purpose of storage is justified. Whether it may be applied to other tissues used in grafting remains to be seen.

[1] *Lancet*, January 30, 1954.
[2] *Am. J. Ophth.*, March, 1956.
[3] *Am. J. Ophth.*, March, 1956.

BLOOD PRESSURE IN INFANCY.

THE estimation of the arterial blood pressure by suitable cuffs attached to the sphygmomanometer, when carefully carried out, is a fairly accurate procedure in adult subjects, and correlates reasonably well with the pressures estimated by intraarterial cannulation. However, in young children the simple procedure is not so satisfactory and is subject to increasing errors with the smaller children. The standard practice of using a cuff whose width is approximately two-thirds the length of the arm is technically difficult in infants. H. Sainsbury[1] found that in infants the differences recorded between the standard smallest one-inch cuff and a cuff exactly two-thirds arm length in width varied by an average of eight millimetres of mercury. With a cuff too wide the readings obtained are too low and, conversely, an excessively narrow cuff apparently elevates the blood pressure readings. The wider recognition of congenital defects of the cardiovascular system, and the growing number of surgical procedures capable of correcting them, have increased the importance of accurate blood pressure estimation in infancy.

Among others, D. Goldring and H. Wohltmann[2] described the flush method of blood pressure determinations in newborn infants. The method depends upon neither auscultation nor palpation, but calls for use of the conventional one-inch sphygmomanometer cuff employed either at the wrist or at the ankle. Blood is gently pressed from the extremity distal to the cuff by such means as a rubber bandage. The sphygmomanometer is pumped up to a little above the anticipated systolic blood pressure, the pressure is released slowly, and the systolic pressure reading is that at which flushing occurs in the extremity.

A. H. Barsanti, R. W. Penick and B. J. Walsh[3] blanch the extremity by means of a second cuff, and they find that a stable level of blood pressure can be obtained by this method provided that the infant can be kept quiet. There are certain arm-leg variations in the pressure in the normal infant, but when the difference exceeds 15 to 20 millimetres of mercury, the condition of coarctation of the aorta should be suspected.

J. O. Forar and M. A. Kibel[4] have used the flush method in the estimation of blood pressure of 143 full-term, normal newborn infants. Readings were taken in pairs on the left arm and left leg and altogether 513 estimations were made. A three-inch rubber Martin's bandage was wrapped around the extremity to obtain the desired ischæmia, and the sphygmomanometer was raised to a pressure of 130 millimetres of mercury. The bandage was removed and the pressure was lowered by six millimetres every five seconds until flushing developed. The systolic blood pressure was taken as that sphygmomanometer reading at which the first pink flush began to be noticeable over the pallid skin. Unlike the original investigators of this method, the authors applied the cuffs around the arm or thigh. Readings confirmed the findings of other workers that the blood pressure rises rapidly in the first three days of life, and thereafter rises more slowly in the neonatal period. The blood pressure was significantly higher in infants of higher weight. In only 9·8% of the blood pressure estimations was the leg pressure lower than that of the arm; the leg pressure was usually equal to, or a little higher, than that of the arm. Forar and Kibel suggest that in only 5% of normal infants will the arm pressure be found to be greater than that in the leg on two successive occasions. Crying was found to increase the arm pressure by 10%

[1] *Arch. Dis. Childhood*, August, 1953.
[2] *J. Pediat.*, March, 1952.
[3] *Clin. Proc. Child. Hosp.* (Washington, D.C.), September, 1954.
[4] *Arch. Dis. Childhood*, April, 1956.

and the leg pressure by 7%. There was no blood pressure difference between the sexes.

Forar and Kibel compare the figures they obtained in the newborn infant with the results of other investigators making direct intraarterial blood pressure readings. From these it is apparent that while not so accurate as direct measurement, and not so accurate as auscultation in the adult, the flush method is still a sufficiently accurate clinical guide to the systolic blood pressure. Furthermore, a two-inch cuff, while tending to give low readings, was found to be less subject to variations than the smaller cuff as advocated by Goldring *et alii*. There are so many variable factors to be accounted for that it is impossible to lay down a precise normal blood pressure in the infant. However, using the flush method, Forar and Kibel found the systolic pressure in the newborn to vary between 42 and 85 millimetres of mercury. The mean systolic pressures for all weight groups in the first eleven days of life varied between 70·3 and 88·3 millimetres of mercury.

PERONEAL TRANSLOCATION FOR PLANTAR FLEXOR PARALYSIS.

IN the routine practice of physical medicine few things are more surprising than the widespread disability resulting from severe or slight imbalance of the muscles controlling the function of the foot. Pain and limitation of activity are not uncommon in children, and the incidence of abnormalities of the feet increases rapidly with increasing age. Most of these conditions are preventible, and with zealous attention to proper exercise some can be cured and most can be ameliorated. From all the multiplicity of man's deformities and expressions of abnormality one important syndrome emerges primarily responsible for most of the acquired deformities of the feet. This is the defect in function of the opposing dorsiflexors and plantar flexors. Largely, the type and degree of disability are dependent upon the particular point at which the delicate balance of forces is upset. In weakness of dorsiflexors, strain is thrown on to the peroneal group and deformities of the *talipes equino-varus* variety ensue. With overcompensation of the toe extensors in paralysis of the *tibialis anterior* the trailing foot is exchanged for the clawed toe. Weakness or paralysis of the plantar flexors results in *talipes calcaneo valgus* deformities or *pes planus*, a shuffling, painful gait with inability to spring off the ball of the foot, and difficulty in climbing stairs. So much classification has surrounded apparently different abnormalities of the foot from corns to crippling conditions, that the basic abnormality is frequently overlooked. While no amount of muscle building will reverse bony changes, pain is usually lessened and function improved, and these are the criteria by which treatment may be judged. Loss of function which occurs rapidly and proves to be irreversible provokes particular problems in the treatment of muscle imbalance in the foot. Probably the most common cause of acute difficulty is the paralysis of the *tibialis anterior* resulting from poliomyelitis infections. Much work has been done on this problem. Deformity resulting from the paralysis of the plantar flexors is not so common, has not perhaps received so much clinical attention and is particularly resistant to treatment. For normal function the minimal power of the plantar flexors must be that capable of enabling the patient to stand with all his weight on the affected foot and with the heel raised from the ground. When all attempts to build up the plantar flexors have failed, the unaffected *peroneus longus* may be transplanted with hope of help from the gastrocnemius. W. H. Bickel and J. H. Moe[1] performed the operation on 13 children in the residual stage of poliomyelitis. Post-operative progress was delayed by difficulties in healing in most of the series. In eight cases the final result was satisfactory, and in three there was no good result from the operation. More recently E. C. Elkins, J. M. Janes, E. D. Henderson and J. J. McLeod[2] have reported their experience in the treatment of 30 patients, most of whom were children. One of the paralyses followed a nerve injury, and one was part of a congenital deformity. In each of the other patients paralysis of the plantar flexors arose out of infection by poliomyelitis. Nine of the patients had the typical limp associated with weak plantar flexors, and in the other patients various degrees and types of deformity were present. Post-operative complications after translocation of the *peroneus longus* included varus deformity due to loss of the peroneal everter, equinus deformity and delay in healing. In each case the *peroneus longus* tendon was freed from its sheath, and the tendon was translocated into a prepared groove on the posterior and plantar surfaces of the calcaneus. The foot was fixed by a cast in plantar flexion. The cast and stitches were removed and physical therapy was commenced after three weeks. Usually four to six weeks of treatment were required to stretch the tendon sufficiently to bring the foot to a right angle with the leg. The results were excellent in 12 cases. In 13 others there was considerable increase in power with lessening of deformity, while in nine patients results were either poor or a failure. In assessing the final outcome, Elkins *et alii* suggest that even in the poor results the deformity was usually arrested, so that the overall value of the procedure was left in little doubt. How far the failures may be attributed to inadequacy of muscle building both before and after the operation the authors do not discuss. However, it appears that exercises were applied mostly in daily treatments. Experience tends to indicate that both before and after operations of this kind vigorous daily and day-long exercise to the point of exhaustion is necessary if the best use is to be made of the translocated tendon of the *peroneus longus*.

[1] *Surg., Gynec. & Obst.*, June, 1944.
[2] *Ibidem*, April, 1956.

THE FATE OF CHILDREN WITH BRONCHIECTASIS.

BY the term bronchiectasis is implied a chronic progressive dilatation of the bronchi associated with secondary infection and with some degree of fibrosis of the affected area. With the exception of the associated condition of congenital bronchial cysts, it is doubtful whether bronchiectasis ever exists except as an acquired disease. The ætiology is usually one of obstruction of the bronchi during pneumonia in early childhood, with resulting dilatation of the weakened bronchial walls. The rate of progression of the disease is very variable and a proper assessment of the degree of bronchial damage can be made only by bronchography. In selected cases, and in the treatment of bronchiectasis by modern surgical techniques, operative mortality is low and many bronchiectatic children are now restored to normal health. However, the outlook for the child varies so much according to the extent of bronchial damage that, unless a large series of sufferers are followed from childhood to adult life, the true prognosis in the different types and with the different treatments is somewhat obscure.

A. G. Ogilvie[1] could find no conclusive evidence of the existence of congenital bronchiectasis; he suggested that acquired bronchial dilatation might be temporary or permanent. He thought that more investigation was needed to ascertain the prognosis in these children. The presence of persistent albuminuria was of severe prognostic significance, and was indicative of the development of amyloid disease. K. A. Perry and D. S. King[2] found that of children in whom bronchiectasis developed before the age of ten years, 65% were dead within twenty years, and 90% within thirty years. Most authors emphasized the need for early operation when this was possible, as children tolerate lobectomy far better than do adults. As S. Diamond and E. L. Van Loon[3] pointed out, the medical treatment of young children could arrest the progress of the disease, but rapid progression was still likely in early adult life. J. Alexander[4] considered that the prognosis

[1] *Arch. Int. Med.*, September, 1941.
[2] *Am. Rev. Tuberc.*, May, 1940.
[3] *J.A.M.A.*, March 7, 1947.
[4] *Ann. Int. Med.*, October, 1944.

in bronchiectasis was more gloomy than was supposed by physicians who were not immediately familiar with the progress and secondary complications of the condition. When the application of lobectomy was impracticable, the efficient use of postural drainage was a particularly valuable measure in maintaining the health of the patient.

C. Strang[1] has made a follow-up study of 208 children admitted to the Newcastle Regional Thoracic Surgery Centre in England between the years 1935 and 1948. The onset in 75% of cases was in the first five years of life. The most frequent primary illnesses were pneumonia and acute bronchitis. Bronchoscopy of the young children revealed that the bronchial tree might be full of creamy pus, even when the cough was not productive. One of the most disabling features of the disease was the frequency of severe lung infections. Asthmatic symptoms were found in 50 children. Finger clubbing was found in 106 cases and was little related to fœtor of the sputum. Physical signs correlated fairly well with the actual site of the disease. Of the children, 52 had definite evidence of sinusitis, 90 had very frequent head colds and 19 had suppuration of an ear. The incidence of sinusitis in cases of bilateral bronchiectasis was 80%. The removal of tonsils and adenoids appeared to be of little value in the prevention or cure of sinus infection. Bronchography revealed that the incidence of bilateral bronchiectasis was 28%. The variety of symptoms was related to the extent of secondary infection rather than to the extent of anatomical involvement.

Pneumonectomy was performed in 48 cases, and 42 children survived. Of these children, 14 were cured and 18 received great benefit by the removal of the affected lung. Lobectomy was performed in 112 cases and there were ten post-operative deaths, mostly in the early years. Cure was effected in 34 children, and the condition of 38 was greatly improved. No children were made more ill by the operation. Strang reports that the operative mortality in the more recent series is less than 1%. The most frequent and important of the complications of lobectomy was collapse of the remaining lung tissue on the affected side; this was particularly serious as further bronchiectatic changes developed rapidly. There was no evidence that the severity of symptoms before operation had any bearing on the ultimate results of surgical treatment. However, asthma and sinus infections were factors pointing to a poor prognosis.

The medical treatment of children for whom operation was not undertaken was chiefly the teaching of proper postural drainage. Of ten such children in whom the disease was initially mild, all remained well and only one failed to improve. In 20 children in whom the disease was too severe for operation, six died within five years of being investigated, and only two are leading normal lives. In one case of mild but generalized bronchiectasis the symptoms have disappeared.

Some comparison, as a group of controls, is made possible by the fact that permission for operation was not obtained in the case of 16 children. Of these, three have greatly improved, despite the cessation of postural drainage, four are in reasonably good health and have improved, and three have died within five years of the original investigation. Even in this group of patients, the signs of clubbing of the fingers disappeared in the case of six patients maintaining postural drainage. By comparison with other series of bronchiectatic children it is evident that the prognosis with conservative treatment is related to the severity of the usual clinical signs.

Strang points out that it is too early to pass opinion on the merits of extensive bilateral operations, though all 14 of his patients in whom this has been carried out have done well. Pneumonectomy can be carried out safely in very young and sick children, though lobectomy is preferably delayed until the ages of between ten and fourteen years. In very young children, pneumonectomy may well be life saving, even when only one lobe is affected. Strang found no evidence that bronchiectasis is a spreading disease, so that in most children the operation can be planned for the most convenient time. In the preparation for operation, medical treatment for some weeks previously is of great importance, and special attention should be paid to the sinuses.

The views expressed by Strang differ little from conventional opinions. In appropriate cases, surgery is the treatment of choice in bronchiectasis in childhood; treatment of sinus infection is of primary importance. As would be expected, the child with severe localized lesions does better than the child with mild widespread bronchial changes associated with asthmatic tendencies. Perhaps the prognosis for children treated conservatively and maintaining postural drainage is rather less gloomy than generally supposed. At the same time, considerable attention is needed to the important question of the prevention rather than to the cure of bronchiectasis in childhood.

[1] *Ann. Int. Med.*, April, 1956.

FATE OF FLUORIDE.

THE principle of providing a very low concentration of fluoride in drinking water for the prevention of dental caries has been accepted by many responsible medical authorities. It was first discussed in this journal on November 13, 1954. The benefits to the teeth, especially of children, have been confirmed in several large surveys in the United States of America, Canada and the United Kingdom. Provided that obvious care is taken in the quantity of fluoride to be added, the procedure is, without any reasonable doubt, quite safe. Large populations exist with a water fluoride content several times as strong as that accepted as dentally desirable. The only effect of excessive concentrations of fluoride appears to be a mottling of the teeth of purely cosmetic importance. The whole question of the desirability of fluoridation of water supplies, together with the evidence available, received previous comment in this journal.[1]

Numerous studies on the physiological fate of fluoride have shown that the element is either excreted in the urine or deposited in the bones and teeth. The deposition is reversible and the exposure of industrial workers to enormous concentrations of fluoride has been succeeded by the urinary excretion of fluoride for several years. R. C. Likins, F. J. McClure and A. C. Steere[2] have studied the relationship of age to the rate of mobilization of fluoride in man. For the purpose of this study, investigation was made of 116 male subjects of all ages from a Texan town whose water supply, prior to 1952, contained eight parts per million of natural fluoride. From March, 1952, the water supply was defluoridated to a mean level of 1·32 parts per million; the study was commenced at this time by regular investigation of urinary fluoride concentration for over two years. On the first day of defluoridation the averages of urinary fluoride were 6·5 parts per million in children and 7·7 parts per million in adults. These values were down to 4·9 and 5·1 respectively after a week. Thereafter, the level remained steady in the children, but fell to 3·9 parts per million in the adults after five weeks. No fall in the output was detected for about nine months, but by the end of the survey the levels were 2·2 parts per million in children and 2·5 parts per million in adults. The authors suggest that, calculated from the results of other investigators, the urine of the series in Texas, on the basis of the defluoridated water supply, should contain 1·0 to 1·5 parts of fluoride per million. So that in fact the excess excretion of fluoride must be accounted for by demobilization from the skeletal system. The influence of age on the excretion of fluoride was noticeable at about the time of skeletal maturation; the children tended to maintain a higher fluoride output than adults for the first twenty weeks after defluoridation. Likins *et alii* conclude that the initial rapid decrease in the urinary concentration of fluoride in adults possibly reflects the loss of readily exchangeable surface-bound fluoride. The rather slower fall in children may be the consequence of the more rapid liberation of fluoride from bone through resorptive activity.

[1] M. J. AUSTRALIA, May 26, 1956.
[2] *Pub. Health Rep.*, March, 1956.

Abstracts from Medical Literature.

RADIOLOGY.

Pulmonary Hypertension in Mitral Stenosis.

W. WHITAKER AND T. LODGE (*J. Fac. Radiologists*, January, 1954) have made a radiological assessment of the heart size, the pulmonary conus, the main pulmonary artery, the main branches of the pulmonary arteries, the perihilar vessels, the peripheral vessels, and the horizontal lines in the lung fields of 25 patients with mitral stenosis, in whom the pulmonary capillary blood-pressures were also known. The radiological signs were correlated with the degree of pulmonary hypertension; this was arbitrarily considered to be mild in seven patients with pulmonary artery mean blood pressures less than 40 millimetres of mercury, moderate in 10 patients with pressures from 40 to 69 millimetres of mercury, and severe in eight patients with pressures of 70 millimetres of mercury or over. The authors conclude that there is no relationship between the degree of cardiac enlargement and the degree of pulmonary hypertension. The finding of a heart of normal size suggests that pulmonary hypertension is of no more than a mild degree. Enlargement of the pulmonary conus is neither a reliable sign of pulmonary hypertension nor an index of its degree. Enlargement of the main pulmonary artery is a sign of pulmonary hypertension, but it is no index of its degree. There is a rough correlation between enlargement of the main branches of the pulmonary arteries and the degree of pulmonary hypertension. The perihilar vessels were enlarged in calibre and increased in number in the majority of patients with severe pulmonary hypertension; however, as these changes were also present in some patients with moderate and mild pulmonary hypertension, they must be regarded only as a sign of pulmonary hypertension and not as an index of its degree. The peripheral vessels were frequently increased in number in patients with moderate and severe pulmonary hypertension; this abnormality was rarely seen in patients with mild pulmonary hypertension. Horizontal lines were frequently present in the lung fields of patients with either moderate or severe pulmonary hypertension.

Subarticular Pseudocysts in Rheumatoid Arthritis.

B. CRUICKSHANK, J. G. MACLEOD AND W. S. SHEARER (*J. Fac. Radiologists*, January, 1954) consider that the loss of localized areas of substance in subarticular bone, though not a feature of all cases of rheumatoid arthritis, is one of the typical manifestations of the disease, and is of primary importance in radiographic diagnosis. A detailed study of the radiographs of patients in whom the clinical diagnosis of rheumatoid arthritis was unequivocal has led to the conclusion that the occurrence of well-defined areas of local destruction of subarticular bone is not a late manifestation of the disease. The lesions are seen at all stages, and may be one of the earliest radiographic manifestations. They are observed most frequently near the chondro-osseous margins and commonly in the heads of metacarpals and metatarsals, or heads or bases of the phalanges, but they also occur throughout the carpus as well as in relation to the major joints. The lesions vary in size from pin-head to large excavated areas several centimetres in diameter resembling large cysts. In the early stages of the disease, and in the acute phase, the local area of destruction is not associated with any evidence of reactive change in the surrounding bone. The lesions may be seen in association with periarticular swelling before there is any appreciable diminution in the joint space. The margins of the lesions are well-defined, but there is no sclerosis of the surrounding bone. In the later stages, and in the quiescent phase of the disease, the lesions may have a definite well-defined sclerotic margin; and they may then resemble, radiographically, the punched-out areas of gout or the cystic areas of degeneration seen in osteo-arthritis. The defects may be seen in relation to joints which show additional radiographic evidence of rheumatoid arthritis, but in other cases the small cyst-like areas are found in bones without any other radiographic sign of disease. Follow-up films in such cases reveal that the joints related to these areas later manifest all the signs of destructive arthritis. Resolution or healing of these "cysts" does not occur; they remain as permanent deformities, or they become included in more extensive areas of destruction of periarticular bone. These cystic areas are an essential part of the disease process and not a complication. They are the result of a defect in the subchondral bone, through which granulation tissue from the surface of the articular cartilage extends into the adjacent cancellous bone. It is suggested that "subarticular pseudocysts" is a convenient title for these findings.

The Association of Cancer with Hiatus Hernia.

D. W. SMITHERS (*Brit. J. Radiol.*, October, 1955) states that hiatal insufficiency, followed by sliding œsophago-gastric hiatal herniation, is common, and as it usually interferes with the valvular mechanism at the lower end of the gullet it leads to the development of a reflux œsophagitis. The association of cancer of the œsophagus and stomach with sliding hiatal herniation is too frequent to be attributable to chance. Ninety-six cases collected from the published literature are reviewed, and 12 new ones are added. Reflux œsophagitis and ulceration, associated with a sliding hiatal hernia, may predispose to the development of œsophageal tumours, but this association is unlikely to be the major factor involved. Massive stomach tumours, such as leiomyosarcomata, may occasionally, by their bulk and pressure, assist in the formation of a hernia in the presence of a lax hiatus. The predominance of adenocarcinomata of the gullet in association with hiatal hernia is likely to be due to a variety of factors. The two commonest of these would seem to be (i) that a small lower portion of the œsophagus is frequently lined by glandular epithelium which, at this constricted site, is particularly liable to malignant disease, and (ii) that there is preferential spread in the submucous lymphatics of the œsophagus by tumours arising at the cardia. As both these tumour types develop in the hiatal tunnel, they tend to cause dilatation and to produce irritation, both of which effects predispose to herniation. Rarely, large portions of the gullet may be lined by gastric mucosa, because the cardia is congenitally situated within the thorax. In more cases, portions of the œsophageal mucosa may fail to undergo normal squamous transformation before birth, thus providing an opportunity for the development of true adenocarcinomata of the œsophagus associated with a normally placed cardio-œsophageal junction. There has been a high incidence of hiatus hernia even within this group in the cases so far reported. This may be due to some special tendency to hiatal insufficiency when the œsophagus is lined by gastric mucosa. However, it is probably no more than a reflection of medical interest at the present time, since adenocarcinomata of the œsophagus occur quite frequently without associated hernia, and any lower œsophageal tumour promotes the tendency to herniation in the presence of a lax hiatus by causing irritation and reflex œsophageal contraction.

Plain Radiography of the Child's Abdomen.

N. HAJDU (*Brit. J. Radiol.*, November, 1955) states that, taking the group of neonatal obstructions as a whole, complications such as micro-colon, perforation, meconium peritonitis, ascites, bands, kinks and volvulus may each, by themselves or in various combinations, occur with any of the primary lesions. In each case a plain radiograph of the abdomen will give due warning of the necessity for immediate surgical relief, which offers a one-in-four chance of survival in the first forty-eight hours and may still be improved upon. A portable X-ray apparatus attached to every maternity unit with instructions to examine each newborn baby ten hours after birth, would go far towards reducing the high mortality rate of these conditions. Often the radiographic findings are so obvious that expert knowledge for the making of the crude diagnosis is unnecessary. Decisions on the advisability of an expert opinion, or of further investigations, will have to be made according to the surgical and radiological facilities available. When the services of a radiologist are available without much delay, the following routine is recommended: if no gas has entered the small intestine from the stomach, the diagnosis is probably one of complete duodenal atresia. A few drops of "Lipiodol" will pass through the incompetent pylorus straight into the second part of the duodenum and will there outline the obstructing membrane or the blind end. If insufficient quantities of air have entered the jejunum, then extrinsic or intrinsic duodenal stenosis is present. A barium enema will reveal the position of the caecum and will produce air contrast of the stomach and duodenum by making the infant cry. A single hypertrophied gas-distended loop

in position across the upper part of the abdomen indicates a high jejunal atresia. No further investigation is required. Multiple gas-distended loops indicate a low small intestinal atresia, meconium ileus, or Hirschsprung's disease with a long aganglionic segment. In the case of intestinal atresia a distinct site of arrest may be demonstrated by suitable positioning. Meconium ileus and Hirschsprung's disease have a more gradual fading of the gas filling. The cautious instillation of "Lipiodol" into the rectum may give the additional information on the presence of a micro-colon. Should gaseous distension of the large bowel be present, Rice's manœuvre for the demonstration of an imperforate anus should be performed or, alternatively, a small bulk enema without previous washout should be given for the demonstration of Hirschsprung's disease with a relatively short aganglionic segment. All films should be carefully examined for intraperitoneal calcification or for free fluid. When the latter is associated with incomplete gaseous filling of the intestine, the diagnosis of fœtal aseptic peritonitis is more likely; if it is associated with gaseous distension of the whole small and large intestine, neonatal omphalogenic (suppurative) peritonitis is highly probable.

Varicella Pneumonitis.

Z. F. ENDRESS AND F. R. SCHNELL (*Radiology*, May, 1956) state that pneumonitis caused by the varicella virus is a rare, but serious, complication of chickenpox; there has been a 37% mortality in cases reported since 1942. Röntgenographically, it produces a widely disseminated nodular infiltration involving all five pulmonary lobes, with an onset early in the second week of the illness. The lung infiltrates vary a little in size and shape; they are produced by the confluence of numerous small areas of consolidation, which surround small foci of necrosis caused by the virus. Initial clearing is rapid and partial; subsequent regression is slow; a period of months elapses before a normal appearance is finally reached. Clinically, severe dyspnœa, cyanosis and hæmoptysis are commonly associated with the condition. Nephritis, encephalitis, hepatitis, pericarditis, orchitis and laryngitis may accompany the pneumonia.

PHYSICAL THERAPY.

Peptic Ulcer and Irradiation.

J. W. J. CARPENDER *et alii* (*Am. J. Roentgenol.*, February, 1956) give a brief report on the use of radiation therapy as an adjunct in the treatment of peptic ulcer. One hundred and sixteen patients with gastric ulcer were treated over a period of seventeen years, and 113 patients with duodenal ulcer were treated during the period 1945 to 1946. After radiation treatment, a reduction in the gastric acidity in most patients and for varying periods has been demonstrated, together with achlorhydria, also for variable periods of time, in a number of patients. In no instance did an ulcer fail to heal when achlorhydria was produced for three months or longer. In the gastric ulcer series 53% have had no recurrence to date. In the duodenal ulcer group, 66% have had no recurrence to date. In 39 patients with massive hæmorrhage secondary to gastric ulcer there have been four instances of massive hæmorrhage following therapy. In 37 patients with duodenal ulcer with hæmorrhage prior to therapy there have been four recurrent episodes of bleeding. No significant complications or sequelæ of radiation therapy were noted in this series. The authors conclude that radiation therapy to the body and to the fundus of the stomach is a safe and useful adjunct to the medical management of peptic ulceration.

Supervoltage X-Ray Therapy.

G. W. BLOMFIELD (*J. Fac. Radiol.*, April, 1956), working at Sheffield, reviews the treatment of 1500 patients by means of a two million volt Van de Graaf generator during the period from 1950 to 1955. He stresses the difficulty of evaluating results of supervoltage as against conventional therapy, but points out that the most striking consequences of supervoltage X-ray therapy result directly from physical factors, such as the increased depth dose. This results in greater ease of treatment, greater comfort of the patient during treatment, and a lack of troublesome complications, which are not normally revealed on statistical analysis. Carcinomata of various sites were considered. In the mouth, the advantages of supervoltage therapy were that higher doses could be given to the lesion without causing necrosis of the jaw when the tumour was encroaching on bone; likewise, dryness of the mouth was more easily avoided. As a whole, improvement of the results with regard to a permanent cure were not startling, but treatment of many more advanced lesions was possible with minimal side effects. In laryngeal cancer, supervoltage therapy appears to be the ideal quality of irradiation, allowing simpler techniques, but careful treatment over a long period of time is as necessary as it always has been. In carcinoma of the bronchus, as expected, the results of treatment were not superior to those of conventional X-ray therapy. In œsophageal lesions, the advantages of highly penetrating radiation make it possible to treat many tumours not previously within the reach of conventional means. Some upper œsophageal growths have responded well, but the average survival time following treatment is only five to eight months. In the case of intracranial and pituitary tumours, supervoltage therapy makes it possible to carry out irradiation often without epilation. However, the results do not appear to be superior to those of orthodox irradiation. For inoperable and recurrent carcinomata of the rectum, supervoltage therapy has given some useful palliative results; several patients have survived for some three years after intracavitary implantation of radium with added X radiation. In bladder carcinoma, external irradiation has previously given poor results. Supervoltage therapy has produced better results and it is possible to treat more extensive lesions. The author feels that rotational supervoltage therapy will again improve these results. Supervoltage therapy may result in greater convenience and ease of treatment in carcinoma of the breast, but does not appear to alter survival rates. In carcinoma of the cervix, the combination of intracavitary radium implantation *plus* X-ray therapy still remains the treatment of choice. With supervoltage therapy, the supplementary dose of X radiation can be readily and easily delivered to the lateral pelvic cavity, and has resulted in an improvement of survivals in stage II and stage III cases, as might be expected. There is much evidence that supervoltage X-ray therapy is a most valuable and humane form of treatment.

Eight Million Volt Linear Accelerator.

R. MORRISON *et alii* (*Brit. J. Radiol.*, April, 1956) give a preliminary report on the use of the eight million volt linear accelerator at the Hammersmith hospital. The principal physical difference between ionization produced by X rays at different voltages is in the ion density, and this is the main factor in the biological response. On this basis there is no appreciable difference in biological efficiency between radium γ rays and 8 MeV X rays produced from a linear accelerator. As compared with 250 kV X rays, there is a much greater depth dose. The maximum dose with 8 MeV X rays falls two centimetres below the skin, and the falling off of the dosage is much less rapid. The depth dose is much less dependent upon the field size, but the dose falls off much more rapidly outside the geometrical edge of the field owing to the predominantly forward direction of the scattered secondary radiation with 8 MeV X rays. Energy absorption per röntgen delivered to the tissues differs between soft tissues and bone, but whereas with 250 kV the absorption is respectively 95 and 350 ergs/cm.^{3}, with 8 MeV it is 95 and 160 ergs/cm.^{3} Thus, with megavoltage therapy the liability of damage (necrosis) to bone in proximity to tumours will be less. Clinically, it seems that megavoltage therapy has the greatest applications in the treatment of deep-seated tumours (such as carcinomata of the œsophagus, bronchus, bladder, pituitary and brain), as it allows a high radio of tumour dose to skin dose. Fewer fields are required because of the high depth dose, but in some situations, such as the mouth, this may be a disadvantage because normal structures deep to the tumour may be irradiated to a high dosage.

Wilms Tumour.

D. KERR AND R. E. FLYNN (*Am. J. Roentgenol.*, May, 1956) report the results obtained in the treatment of 28 cases of Wilms tumour in children during the period from 1931 to 1951. Prior to 1938, 14 children were treated by irradiation alone, and of these four survived two years and two survived five years, but all eventually died of the disease. Since 1938, a further 14 children have been treated by a course of irradiation, followed in eight to ten weeks by nephrectomy. Of these, seven survived two years and five survived five years. Four patients so treated are alive and well from five to nine years later. A tumour dose of 2000 *r* to 3000 *r* (air) was given. The authors conclude that radiation holds the disease in abeyance for two or more years, but that nephrectomy is essential to cure.

Special Article.

OPERATIONS OF THE ROYAL NAVAL MEDICAL SERVICE IN THE SECOND WORLD WAR.

THE second volume devoted to the Royal Naval Medical Service in the "History of the Second World War" deals with "operations".[1] It is so full of interest that a lengthy review which has been prepared is published as a special article.

To a large extent this volume has been written by the naval surgeons themselves, as very free and effective use has been made of extracts from the vast amount of material available in their war diaries. These have been grouped to describe problems, not all of them clinical, ashore or afloat, at successive periods of the war, in different areas. It is thus easy, for instance, to understand changes in medical planning and organization on shipboard following heavy mortality among medical personnel early in the war, which led to an increase and change in location of medical posts with wide dispersal of personnel and stores and an extension of first-aid training to include, in theory at least, every member of the ship's company. The day-to-day journal of a naval surgeon over a period of eleven months spent in the Mediterranean and in northern waters is recorded as representative of his normal activities and commitments, and as illustrating how he coped with any special medical problems or hazards that arose. Various features of this record are discussed in some detail, such as medical aspects of enemy air attacks, the scope of first-aid training, the effects of fuel oil on casualties after immersion, and particularly the development and maintenance of high morale: the last-mentioned subject is referred to later when the Norwegian campaigns and Arctic convoys are reviewed.

Amongst the commitments of the Royal Navy ashore there is some reference to tented hospitals which functioned in Crete and, under very unpleasant conditions, in the Maldives. These were new and experimental units carrying out tasks more appropriately performed by army medical units.

Grateful acknowledgement is made of the tenacity of purpose, gallantry and devotion to duty of the nurses of the Royal Naval Hospital in Hong Kong. An acute observer, the junior surgeon of His Majesty's ship *Gloucester*, whose experiences failed to destroy his sense of humour, reports on the medical aspects and general organization of various internment camps in Germany and Greece wherein he was lodged over a period of two years. Less fortunate were the surgeons surviving from His Majesty's ship *Exeter*, who spent three years interned in Macassar, Sumatra and Batavia; they were a source of inspiration to their fellow internees, and displayed extraordinary initiative and resource in caring for the victims of Japanese barbarity. Variety is introduced by an account of the experiences of the adventurous surgeon who was parachuted into Serbia and later into Malayan jungles.

Clinical features peculiar to naval warfare are discussed, as, for instance, variations in injuries due to mines, torpedoes and depth charges. When casualties could not be transferred to shore hospitals or hospital ships within reasonable time, it was necessary to perform urgent major surgical operations at sea. Results, however, were not good, and the most experienced surgeons were the most conservative even when capital ships were available. Apart from technical difficulties there were, during the continuance of the action, noise, concussion and blast, with occasional failure of light, all of which made it difficult to maintain a balanced judgement; weather conditions were frequently an added embarrassment. In Arctic convoys fingers were often too numbed to function. It was found that in a damaged ship during or after an action, if casualties had to be treated many of the peace-time standards of surgery had to be abandoned, and post-operative treatment was always inadequate.

Added interest comes to the narrative from efforts made, usually successfully, to discover the ultimate fate of patients whose early treatment is mentioned in the diaries. This must have required a vast amount of patient research.

The account of the medical aspect of the chief naval events covers the whole war period and is a memorable record of heroic effort.

The account of the Arctic convoys appeals as the most enthralling. They ran the gauntlet of four days' continuous attack outward and homeward bound. Bombers, U-boats and mine-layers combined in a frenzy of destruction. (On one occasion eight ships, mostly merchantmen, were lost in twenty minutes.) To this inferno of noise were superadded the intense cold, the general eeriness of the situation, and the hopelessness of survival if their ship sank. Small wonder that the troops became unstable and disorientated, and lost all sense of proportion. Mental trauma caused physical deterioration. Survivors and wounded in this region were for a time treated in Russian hospitals, where they were given the best that poor facilities provided, but in 1942 a Royal Naval Hospital was established at Varenga in northern Russia. There were 75 beds, and the standard of treatment was high under very trying conditions. The presence of this hospital in the area was a great stimulus also to the morale of the Royal Navy and the Merchant Service.

The volume concludes with an account of "Kamikaze" suicide attacks.

A very judicious selection has been made from the material in the diaries and the result is an historical record intensely interesting throughout and at times quite exciting.

The editor states that the volume aims at fulfilling a dual purpose—firstly, to set on proud record for posterity the work of naval doctors and nurses; secondly, to provide a work of reference for such of their successors as may be called on to play a similar role on behalf of their country and profession. In both respects he has succeeded admirably, and he has also provided a story with a wide appeal to general readers.

[1] "History of the Second World War: United Kingdom Medical Series." Editor-in-Chief, Sir Arthur S. MacNalty, K.C.B., M.A., M.D., F.R.C.P., F.R.C.S. "The Royal Naval Medical Service", by Surgeon Captain J. L. S. Coulter, D.S.C., R.N. Volume II: Operations; 1956. London: Her Majesty's Stationery Office. 9½" × 6", pp. 543, with 19 illustrations. Price: £2 17s. 6d.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on May 2, 1956, at the Alfred Hospital, Melbourne. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the hospital.

Nutrition and the Intractable Cardiac Problem.

DR. MORRIS C. DAVIS discussed the intractable cardiac problem under two headings, (i) intractable pain and (ii) intractable congestive failure. He said that the patients selected to illustrate each group, to the date of commencement of nutritional therapy, had not shown any response to previous standard forms of medication. In the first group emphasis was placed on the neuritic factor in angina. It was considered that the proportion of the pain which was of that nature could be determined only by therapeutic trial. Routine treatment consisted of parenteral vitamin *B* group therapy and a diet of high protein and low fat content. In all the cases under discussion no other significant change was made in standard treatment, and all patients, to the moment of treatment, had intense anginal pain unrelieved to that time.[1] Dr. Morris said that the patients' histories confirmed the intractability of the symptoms and the dramatic change with therapy. A feature common to all, and an indication of vitamin *B* group deficiency, was the extreme fatigue in each case.

Intractable Pain.

The first patient shown by Dr. Davis was a man, aged sixty-five years, who had been first examined in January, 1955. He said that up to that date and for the past three years he had had severe typical precordial substernal pain and nocturnal dyspnœa requiring five pillows at night for sleep. Dyspnœa was intense when he fell from the pillows during sleep. He had to give up work. Extreme fatigue was present. To the date of examination he had obtained no significant relief from standard therapy, and he was virtually immobilized; for ten years he hardly knew what it was to be free of chest pain. Investigations revealed coronary ischæmic changes in the electrocardiogram compatible with the patient's years and sufficient to have given his condition the label of angina. As he was unrelieved by routine vasodilator therapy, this was stopped, and he was given a parenteral course of "Combex" and a protein-rich diet, at first with added vitamins. No other treatment was carried out. The patient stated that within two months of the

[1] Further to emphasize that point, and because angina is subjective, the patients gave their histories directly to the visiting physicians present at the demonstration.

commencement of treatment he was free of pain and well. By that time he felt that life was worth living, had returned to a normal routine, and slept and ate well.

Dr. Davis's second patient was a man, aged fifty-seven years, who had had an attack of coronary thrombosis in November, 1953, for which he had been in hospital, and a second attack five months later, requiring ten weeks in hospital. From then to February, 1955, when he was first examined, he had been confined to home with intractable and severe, disabling pain, which prevented him from leaving his house without escort. He was extremely anxious and worried and could do very little physical work. Examination of the patient revealed little of objective significance except slight limitation of left shoulder movement. An electrocardiogram showed slight flattening of the *T* wave in lead I, but no other anomalies. Some tenderness was present over the sixth cervical vertebra. He was given an immediate course of nutritional therapy as outlined, and referred for physiotherapy to shoulder and spine. He made an immediate improvement, and by April, 1955, was back at work, virtually symptom-free. He stated that since the injections he had become a human being and was completely different in outlook.

At Dr. Davis's request the patient demonstrated the extent of his improvement by showing the nature of the exercises he was performing daily. They consisted of a fifteen-minute routine of lying on the floor, bending, stretching and throwing himself about in the most intense manner, without pain. He went through that demonstration on three occasions during the evening without ill effect. Dr. Davis commented that the patient had been in hospital on two occasions for coronary thrombosis (five months and three months), and had then been immobilized by pain, but he was able to carry out strenuous exercises after a course of nutritional therapy as outlined. The point was made that only by therapeutic trial could one determine how much of the pain of angina was of coronary origin, and how much was truly neuritic.

Dr. Davis then showed a female patient, aged sixty years, who had a history of typical, extreme pain, uniformly called angina by her medical advisers. It had been unrelieved for fourteen years; yet within four months of the treatment described she was doing full work and free of pain.

The next three cases followed similar trends. The patients had intractable pain, typical and to the date of therapy unrelieved, and showed dramatic improvement after treatment. One patient, at Dr. Davis's request, to prove that the neuritic factor might predominate, showed how by a trick of supination and extension of the left arm the so-called "anginal" pain was immediately relieved. This patient had electrocardiographic findings compatible with cardiac ischæmia.

Intractable Congestive Cardiac Failure.

Dr. Davis then described the basis of therapy in intractable congestive failure. He said that it had been shown by Spies that objective evidence of deficiencies occurred even in apparently healthy people despite reasonable diets. If that was so, then in chronic ill health the possibility of a nutritional deficiency was doubly important. In congestive cardiac failure the inevitable episodes of repeated over-digitalization, hepatic and gastric congestion, and periods of bed-rest with minimal food intake, resulted in deficiencies of significant nature. From those data the premise was made that no case of cardiac œdema and congestive failure occurred without a nutritional factor supervening. Routine therapy therefore, as carried out in Dr. Davis's wards at the Alfred Hospital, consisted of (*a*) a diet of high protein and low fat content, 1500 to 1800 Calories per day from the outset, even in the severe phase of failure, and (*b*) the parenteral administration of *B* group vitamins. In all the cases under discussion, no other change was made in the routine therapy, which to the date of commencement of treatment had proved ineffectual. Dr. Davis said that, as in the case of cardiac pain, how much of the œdema and general congestion was of nutritional origin could be determined only by clinical trial.

The first patient in the second group shown by Dr. Davis was a woman, aged fifty-one years, who had had rheumatic fever at the age of seventeen years. For four years she had suffered from extreme distress on even lifting a broom, and for two years from gross œdema not responding to diuresis, digitalis, sedation *et cetera*. When she was first examined in May, 1955, she was extremely dyspnœic. The apex beat was in the posterior axillary line, seven and a half inches from the mid-line. The findings were of an order which could reasonably be regarded as the end phase of prolonged rheumatic heart disease, mitral regurgitation and left auricular enlargement being the gross features. There was an immediate response to routine treatment carried out over fourteen days, and within two months the patient was making beds and doing her own washing, was able to walk 440 yards and was free of significant breathlessness. She had had no further period of bed rest. General treatment for her heart condition was otherwise unaltered. At Dr. Davis's request the patient gave her own history for confirmation. She comfortably walked about and virtually strode into the demonstration room. It was possible to illustrate her apex beat through the clothing, still some seven and a half inches from the mid-line. Emphasis was placed on the absence of significant physical change in the heart size despite the dramatic change in symptoms.

The second patient in the group was a woman, aged thirty-three years, who had had long-standing rheumatic heart disease with extreme cardiac enlargement; the transverse diameter occupied almost the whole of the chest wall, the liver was palpable three fingers' breadth below the costal margin, and the apex beat was in the posterior axillary line. She had been to Zurich and other medical centres, all of which had emphasized the need for diuretic and digitalis therapy. Detailed letters from overseas showed no reference to nutritional therapy along the lines outlined by Dr. Davis; however, all confirmed the presence of mitral and aortic lesions, tricuspid incompetence, gross hepatic enlargement and tremendous cardiac enlargement. When she was first examined she was able to carry out only the very slightest of movements, was dyspnœic on walking a few yards, and was unable to do housework. Routine therapy was instituted and an immediate response was noted. She stated that her improvement dated from that time, and at the time of the meeting she was comfortable and able to do much of the routine housework. The physical findings in the heart remained unaltered.

Dr. Davis's third patient in the group was a woman, aged fifty-four years, who had gross rheumatic heart disease with congestive failure, and had been in another hospital for six weeks without responding to treatment, prior to her admission to the Alfred Hospital. On examination of the patient, gross œdema was present with extreme congestive cardiac failure. Routine therapy was begun. An effective response was obtained within five days, and three weeks later, on the night of the meeting, she was free of œdema, had had no further nocturnal dyspnœa and was more stable than she ever could remember.

Dr. Davis finally showed a woman, aged seventy-eight years, who had been first examined at the age of sixty-eight years when she was in gross congestive cardiac failure with apparent progress of senile changes. Her condition seemed terminal. She was given routine therapy from the outset, which was repeated at intervals of about four months from that time. At the time of the meeting, ten years later, despite cardiac enlargement of the same order as in 1946, she was able to walk about free of œdema.

Comment.

Dr. Davis said that the purpose of the demonstration was to illustrate the importance of the nutritional factor in intractable heart disease. Frequently, when all previous treatment had failed, the recognition of that aspect of the condition significantly changed symptoms and prognosis. The patients shown represented a very small fraction of his total experience. Nevertheless they seemed sufficient to indicate that despite gross physical signs, attempts should always be made to correct the nutritional factor in such cases. On such therapy clinical improvement was often dramatic, despite no change in physical signs in the heart. Dr. Davis suggested that the fact should make clinicians ponder on the problems of prognosis in heart disease based only on physical signs.

Diastolic Murmurs and Their Interpretation.

DR. H. B. KAY and DR. J. M. GARDINER gave a demonstration of the assessment of diastolic murmurs. The three main groups discussed were apical mid-diastolic murmurs, basal diastolic murmurs and continuous murmurs. Examples were illustrated by phonocardiograms, and patients with the various types of murmur were available for examination. The lesions causing these murmurs, and their differentiation, were discussed.

It was stated that apical mid-diastolic murmurs were most commonly caused by mitral valve disease. There the important clinical differentiation was that of "tight" mitral stenosis from mitral stenosis and incompetence. Auscultation was of considerable importance. In "tight" stenosis there was typically a loud first sound at the apex, no systolic murmur, an opening snap, and a mid-diastolic murmur which did not

start loudly and was long; in normal rhythm, it had presystolic accentuation. The second sound might be loud and split in the pulmonary area. In mitral stenosis and incompetence the first sound was often soft, there was usually a pan-systolic murmur, and the opening snap was often soft or absent. The mid-diastolic murmur started loudly, sometimes with a clear third heart sound, and was short. In congenital heart disease a mid-diastolic murmur might be audible at the apex in patent *ductus arteriosus* or ventricular septal defect when there was a large shunt, or in atrial septal defect, when it was often best heard at the left sternal edge. It was also found occasionally in cases of coarctation of the aorta. In cases of frank aortic incompetence with left ventricular dilatation, an Austin Flint murmur was occasionally found at the apex; phonocardiograms were shown from one such case, in which the mitral valve was found to be normal at necropsy. An example of an auricular diastolic murmur occurring in complete heart block was also illustrated.

Examples of the early diastolic murmurs of aortic incompetence and pulmonary incompetence were shown. Emphasis was laid on the essential difference between the "to-and-fro" murmurs in those conditions, in which there was a silent gap before the second heart sound, and the continuous or Gibson murmur of patent *ductus arteriosus*, in which there was accentuation in late systole.

The typical continuous murmur of patent *ductus arteriosus* was illustrated. Conditions under which the signs might vary were mentioned. It was pointed out that in infancy the murmur might not be continuous, yet might be typical in its shape, showing late systolic accentuation. Other infants with a large ductus might have a murmur only in systole; that might occur also in older subjects with a very large ductus. When there was considerably raised pulmonary resistance with severe pulmonary hypertension, the typical murmurs might disappear or be replaced by the murmur of pulmonary incompetence. Continuous murmurs might also be heard in pulmonary atresia and other cyanotic congenital heart lesions in which there was a well-developed collateral circulation. Those murmurs tended to be widely heard front and back, usually on both sides of the mid-line. Other forms of continuous murmur mentioned were pulmonary arterio-venous aneurysm, and the relatively common venous hum found in children, abolished by change of posture and of position of the head.

Peptic Ulcer.

DR. P. J. PARSONS showed six patients suffering from peptic ulcer, to illustrate features in the natural history of the disease. In two cases of lesser curve gastric ulcer, rapid healing had been achieved with medical treatment. In one case, because partial gastrectomy was repeatedly refused, there was an opportunity for studying recurrent ulceration in the same site on four occasions over a period of sixteen years; the ulcer healed completely on each occasion. Two boys with duodenal ulceration, one aged thirteen years and the other aged fourteen years, were shown. There was a family history of juvenile ulcer in the first case. Pain was the prominent feature in both cases. Healing with medical treatment in hospital was slow. Finally, two middle-aged patients with superficial gastric ulceration complicated by severe hæmorrhage were shown.

Leuchæmia and Lymphoma.

DR. JOHN MCLEAN presented patients suffering from acute leuchæmia and lymphoma.

The first patient was a girl, aged four and a half years, who had been admitted to the Alfred Hospital on July 23, 1955. Over a period of several weeks she had had anorexia and had complained of generalized pain. On examination of the patient, there was enlargement of lymph glands and spleen, and a blood count gave the following information: the hæmoglobin value was 4·5 grammes *per centum*, the leucocytes numbered 15,000 per cubic millimetre, the lymphoblasts numbered 9000 per cubic millimetre, and the platelets numbered 16,000 per cubic millimetre. The diagnosis of acute leuchæmia was confirmed by bone marrow examination. Blood transfusions and a course of treatment with aminopterin (total dose five milligrammes) were given. A remission occurred, and aminopterin was continued in a maintenance dose of 0·5 milligramme on alternate days. Cortisone was also given, in a dosage of 25 milligrammes per day. The remission extended for a period of five months, until December, when anorexia and abdominal pains indicated a possible toxic effect of aminopterin, which was discontinued. Two direct blood transfusions were given, but no other treatment. Her condition improved, and she remained well for three months, after which she became feverish and complained of severe abdominal pains. Blood examination revealed a recurrence of leuchæmia. "Puri-nethol" was administered in a dose of 50 milligrammes per day for a period of ten days. Another remission developed, which was still present at the time of the meeting. On April 30, 1956, there was no enlargement of lymph glands or spleen, and the blood findings were within normal limits.

Dr. McLean next showed two adult female patients suffering from acute leuchæmia. In both cases a course of treatment with "Puri-nethol" had produced a remission which was characterized by relief of symptoms and a pronounced diminution in number of blast cells in blood and marrow.

Dr. McLean finally showed two adult male patients with enlarged glands, biopsy of which had shown the condition to be lymphoblastic lymphoma. They had been treated with triethylene melamine and triethylene thiophosphoramide. The drugs were given by mouth in small dosage in short courses of treatment. The total dose of TEM in a course was five to ten milligrammes, and the drug was never given again until at least eight weeks had elapsed. A remarkable effect was noticed with this method of treatment. The glands regressed in size almost to complete disappearance, and there were no untoward effects on the blood. Triethylene thiophosphoramide was similarly effective, and being less toxic, could be administered over a longer period of time.

Mild Vasomotor Rhinitis Aggravated by Pansinusitis.

DR. ERNEST CHENOWETH showed a girl, aged fifteen years, who had been referred to the allergy clinic in September, 1955, having suffered from mild perennial allergic rhinitis most of her life. In May, 1955, she had contracted a severe upper respiratory tract infection, with facial pains in the antral and frontal sinus regions. After this her nose became constantly blocked, and she sneezed every day. She had a persistent yellow nasal discharge. She had been allergic to house dust for years. Her father suffered from hay fever and eczema. The patient's nose had been broken at the age of eight years and again in February, 1955. No X-ray examination of the sinuses had been made. The only result of allergy tests was a mild reaction to house dust.

On examination of the patient, the nasal mucosa was grossly œdematous and some mucopus was seen. No abnormality was detected in the throat. An X-ray examination revealed uniform opacity in both antra, and diminished translucency in the frontal and ethmoid sinuses. The sinusitis was attacked systemically with sulphadiazine and penicillin; and locally with the infra-red lamp (three times a day) and "Argotone" nasal drops instilled frequently. The patient was examined four weeks later, when she had been free of nasal symptoms for the preceding fortnight. An X-ray examination at this time revealed virtually clear and healthy sinuses. Eight months later she was still free of symptoms.

Vibrocardiography.

DR. MARGARET DOWN described an instrument, the vibrocardiograph, which recorded cardiac vibrations including those below the audible range. She showed recordings of cardiac vibrations from a series of normal subjects, attention being drawn to first and second principal vibration complexes, preliminary waves, fundamental vibrations and their harmonics, and the occasionally seen chest waves. Recordings from cases of mitral stenosis showed increased harmonic vibrations at the mitral area in the first principal vibration complex. Recordings of hypertensives showed increased duration of the first principal vibration complex at the apex and increased harmonic vibrations in the second principal vibration complex at the aortic area.

Urinary Chromatography.

DR. C. C. CURTAIN and DR. D. EMSLIE-SMITH described the use of urinary chromatography. It was pointed out that since its inception as a technique for the analysis of small amounts of complex mixtures, paper partition chromatography had found increasing use in clinical medicine. The display presented set out the history of chromatography and modern techniques, illustrated by actual chromatograms and apparatus. Emphasis was laid upon the diagnosis and significance of aminoaciduria, and chromatograms were displayed showing patterns typical of some of the conditions in which that occurred.

Arteriographic Findings in Intermittent Claudication.

DR. D. LLOYD DICK and DR. A. J. BARNETT gave a demonstration of arteriography in intermittent claudication. A chart and illustrative arteriograms were shown presenting the arteriographic findings in 54 cases of intermittent claudication. The radiographic nature of the lesion was:

widespread arterial irregularity and narrowing, but no complete block, 12 cases; pronounced local narrowing without complete block, four cases; one block in a major artery, 34 cases; multiple arterial blocks, four cases. The commonest sites of arterial occlusion were the superficial femoral artery and the upper part of the popliteal artery. Blocks in those sites accounted for 26 of the 34 instances of one block in a major artery.

Mammary Fistula.

DR. IAN A. FERGUSON, of the University Surgical Unit, on behalf of PROFESSOR M. R. EWING and himself, demonstrated the clinical features and management of mammary fistula as described by Atkins (*Brit. M. J.*, 1955, 2: 1473). The patient, a woman, aged thirty-nine years, presented with a persistent discharging sinus on the areola of a non-lactating breast, of fifteen months' duration. During that period the abscess had been incised on two occasions, but without benefit. The sinus was found to communicate directly with one of the milk ducts on an indrawn nipple. It was completely excised, and the oval defect remaining healed quickly by granulation. There was no histological evidence of tuberculosis.

Management of Ileostomy and Colostomy.

DR. R. S. LAWSON showed a series of 12 patients on whom operation had been performed for ulcerative colitis and for carcinoma of the rectum, and made particular reference to the management of the ileostomy or colostomy with which each patient was provided. It was demonstrated that most of the patients had very little trouble in coping with an artificial anus, but in some of them various difficulties were encountered. Ileostomy might give trouble from too free a liquid motion, which could be corrected to a degree by the use of methyl cellulose. Skin irritation was also likely to be troublesome. Stenosis and fistula were fortunately not represented; but one patient was content with his ileostomy prolapsed about one inch into the receptacle.

Dr. Lawson said that colostomies were prone to prolapse, stenosis and incisional hernia, all of which had occurred in the patients shown. One patient illustrated clearly that prolapse might be induced by the wearing of an unsuitable appliance, and corrected without operation once that had been attended to. Operation for a previous prolapse had already been performed on that patient. Further operations for stricture of the colostomy had been necessary on four occasions on three of the patients (twice on one patient). In one of those cases an incisional hernia also required operation, and those two conditions might be mutually aggravated—stricture caused ballooning of the bowel behind it, with undue strain and distension of the abdominal wall where the bowel passed through it. Avoidance of a redundant length of bowel proximal to the colostomy, careful repair of the abdominal wall around it, and coaptation of the bowel margin to the skin incision seemed to lessen the chances of those blemishes developing, though to some extent their occurrence appeared to be fortuitous.

With regard to colostomy appliances, Dr. Lawson said that a hard-rimmed, elevated cup should be avoided, as it tended to cause extrusion of the colostomy; prolapse had occurred in one patient from that cause. Otherwise, patients in the series had obtained satisfaction with different makes of bag—for example, the "Wagner", the "Davol", and those of Down Brothers. Bags were essential for a patient with an ileostomy, but some of the best-controlled colostomies had been managed merely with a pad of dressing and a belt or corset—home-made or otherwise—and with no bag or receptacle at all. That arrangement seemed to keep the colostomy in the best condition, so that it lay flat and flush with the abdominal wall. In no patient was the regime of bowel washouts recommended or practised. The experience of Dr. Clayton-Jones, himself a "colostomite" of over ten years' standing, was quoted in that regard and in other matters of colostomy control, as detailed in his letters to the *British Medical Journal* of January 7 and February 18, 1956. Many of the points Dr. Clayton-Jones had made were confirmed by the experiences of the series of patients presented, which included "colostomites" of from one to fourteen years' standing.

Dr. Lawson concluded, from a review of the 12 patients, that the final management of colostomy or ileostomy must be left to the patient's own devices, after he or she had been given the option of various appliances available, several of which were on display at the demonstration.

Arterial Grafting for Traumatic Rupture of the Brachial Artery.

DR. J. KENDALL FRANCIS showed a patient who had suffered a complete rupture of the brachial artery, the limb having been saved from what appeared to be an inevitable amputation by the use of primary arterial grafting. The patient, a man, aged thirty-five years, had been involved in a motor-car accident. He was admitted to hospital with multiple injuries comprising a crush injury of the left side of the chest, with fractures of the clavicle, the neck of the scapula and the upper six ribs, contusion of the left lung with hæmothorax, and a grossly deformed compound fracture of the mid-shaft of the left humerus, complicated by complete severance of the median nerve and the brachial artery. The forearm and hand were pale and cold, with cyanotic mottling, completely paralysed and anæsthetic. A brachial plexus block (performed with difficulty owing to gross neighbouring hæmatoma) produced no improvement in the circulation in the hand. The patient was grossly shocked, but after a transfusion of four pints of blood and serum, a general anæsthetic was administered.

At operation it was found that the brachial artery was completely severed alongside the fracture, the severed ends being separated by spasm and retraction, and occluded by thrombus extending for two inches in the distal segment of the artery. Both ends were resected until bleeding occurred (a slow trickle only coming from the distal end). The gap of three inches was then replaced by a length of femoral artery obtained from the hospital's supply of stored refrigerated arterial grafts. This graft was anastomosed with continuous sutures at either end, after the ends of the brachial artery had been split open to overcome the disparity of the calibre. The fractured humerus was then fixed by a plate and screws, and the severed ends of the median nerve were sutured after being trimmed. Papaverine packs were applied locally, and heparin was employed intra-arterially to combat spasm and thrombosis of the reconstituted brachial artery.

Dr. Francis said that the radial pulse was immediately and permanently restored, although by that time eight hours had elapsed since the accident. The patient's recovery from his other injuries was satisfactory. Although regeneration of the median nerve would necessarily be a long, slow process, it was evident when the patient was presented at the meeting, one month after his accident, that good recovery of his hand could be expected. There were no residual symptoms of ischæmia, crush syndrome or Volkmann's contracture. The hand appeared to have a normal circulation, and the movements of the fingers and thumb were already restored to a substantial degree, owing to the presence of considerable ulnar nerve overlap. That remarkable achievement would have been impossible but for the employment of a vascular graft, and it indicated how mandatory was early exploration in cases in which ischæmia was present below the level of injury.

Carcinoma of the Tongue and the Floor of the Mouth.

DR. D. B. PEARCE showed patients illustrating the treatment of carcinoma of the tongue, the tonsil and the floor of the mouth. In each case the primary lesion had been treated by implantation of radon seeds or needles, that being followed when possible by a surgical block dissection of the cervical lymph nodes. On one patient with bilateral enlargement of the cervical lymph nodes in association with a carcinoma of the floor of the mouth, Dr. N. Hamilton had performed a bilateral two-stage block dissection, including removal of both jugular veins.

Fractures of the Mandible.

DR. W. A. DOTT showed a series of pre-operative and post-operative radiographs to demonstrate some methods of treatment of fractures of the mandible. The series was divided into three categories: (*a*) fractures of the edentulous jaw, (*b*) fractures which involved teeth, (*c*) fractures of the condyloid process.

Fractures of the Edentulous Mandible.

In the first case, a fracture in front of the angle was complicated by the presence of a dental cyst. Treatment was by intraoral enucleation of the cyst, and a stainless steel wire placed across the fracture line in the region of the upper border of the mandible.

The second case was one of displaced fracture in front of the angle. Treatment was by open operation, and a small vitallium plate screwed near the lower border on the lateral surface of the mandible.

In the third case the patient had sustained undisplaced bilateral fractures of the body of the mandible. Treatment was by the application of a Barton jaw bandage only. This case was presented to show that that simple treatment was sufficient in selected cases.

Fractures of the Mandible Involving Teeth.

In the first case in the second category, the patient had sustained bilateral fractures of the body of the mandible involving right and left unerupted third molars. Treatment was by the removal of those teeth and an upper border wire placed across the fracture line. In conjunction with that, cast metal splints were applied, and intermaxillary fixation of the distal fragments was thus obtained.

Dr. Dott commented that fractures involving unerupted teeth were common, and that was yet another indication for their early removal.

In the second case, bilateral fracture of the body of the mandible was present, involving the lower right first molar and the lower left second bicuspid. Treatment was by extraction of the teeth in the line of fracture. Cast silver sectional splints were applied, and by means of intermaxillary fixation, both the proximal and distal fragments were secured in proper position.

Fractures of the Mandibular Condyle.

A child, aged three and a half years, had sustained bilateral fracture-dislocations of both condyloid processes of the mandible. No definitive treatment was carried out, in order to allow the child to use her jaw, so that the risk of ankylosis would be lessened. Dr. Dott said that it would be of interest to follow that patient, to check any possible damage to the growth centre of the condyles.

Lesions of the Middle Lobe of the Right Lung.

DR. B. L. DEANS and DR. J. A. BLOOMFIELD showed a series of radiographs illustrating various lesions of the middle lobe of the right lung, including acute infections, various causes of collapse, and different types of carcinoma. Films were included to show the value of various procedures in demonstrating right middle lobe lesions, and their differentiation from lesions in adjacent lung segments.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

THE DOCTOR AND THE CHEMIST.[1]

[From the *Australian Medical Gazette*, December, 1883.]

WE have before us a letter written by a firm of Wholesale Druggists in Sydney to a chemist in a country town in New South Wales. We extract from it the following passage which speaks for itself.

"Individually we are of the opinion that doctors in country towns are not to be depended on and that it is better for a chemist to ingratiate himself with the public and to try and obtain a name as a good prescriber. Medical men as a rule are narrow minded and think that chemists should obtain a bare livelihood."

Special Correspondence.

LONDON LETTER.

Information to the Press.

THE principles which should guide both the medical staffs of hospitals and the Press in the publication of information concerning the condition of patients were discussed last May by a joint committee of the profession and Press representatives. Official approval has now been given to their recommendations. The medical profession has always tried to preserve the confidential role existing between themselves and their patients, but also recognizes that the Press has a reasonable desire for information in cases of public interest, such as a national disaster or the illness of a well-known person. The maintenance of good relations between profession and Press is important, and the new procedures recommended will, it is hoped, contribute to mutual confidence. It is suggested that all hospitals should have an experienced and responsible officer available at all times to answer Press inquiries. He should be satisfied that the inquiry comes from an accredited Press representative, and, if unknown to him, ask for documentary evidence of accreditation. Telephone inquiries should be checked back before information is given. In the case of accidents such as a railway or air disaster involving a number of people, steps should be taken to insure that the relatives of the injured have been informed before names are published. The early publication of names is necessary to allay the anxiety of next of kin, who were, or might have been, involved in the disaster. Further information should be given only with the patient's consent. Information does not necessarily mean a diagnosis but a general indication of condition. The same rules apply in the case of illness other than accidents. Information should not be divulged without the consent of the patient. In the case of well-known people, a brief indication of progress may be given on the authority of the doctor in charge of the patient.

Doctors' Tribunals.

The investigation of complaints made by patients against doctors in the National Health Service is examined by a disciplinary medical committee, which has the power of fining the erring doctor. The committee conducts its business in secret. Some public uneasiness in this procedure has been expressed and the subject has been discussed this week between representatives of the British Medical Association and the Committee on Administrative Tribunals in London. The medical representatives submitted that the publication of these inquiries would harm the essential confidential relationship between doctor and patient, especially if the complaint was not substantiated. They felt that, on balance, secrecy was the right policy. The legal representatives, however, contended that these grounds were insufficient for the Tribunal to continue to sit in secret. In the Tribunal's eight years of existence no practitioner has asked for the inquiry to be made public.

Hospital or Home Care.

Dr. G. E. Godber, Deputy Chief Medical Officer of the Ministry of Health, in an article in the July issue of *The Practitioner* contends that:

> Hospital admission should only be arranged when it is really essential and all treatment and nursing care which can be given at Home should be given there. The National Health Service depends primarily on comprehensive home care, with Hospital and specialist services only for diagnosis and treatment of illness outside the scope of the family doctor and his supporting team. It should not be regarded as a service for Hospital in-patients, supported by facilities for home care. This emphasis on the family doctor as the key member of the Health Service, with Hospitals to serve, not replace or displace him, should go far to restoring him to his rightful place in the community.

In the National Health Service, the general practitioner has at his disposal a domiciliary consultant service, health visitors, home nurses, home helps, midwives and mental health workers, and in many areas, pathological and X-ray diagnostic facilities.

The number of patients admitted to hospitals (the most expensive part of the National Health Service) has risen year by year since 1949. Factors which have contributed to this are the increased public demand, the increased extent to which the complexity of modern medicine falls outside the scope of the family doctor, and the demand for beds for patients who in former days could be nursed at home by wives, mothers and daughters who nowadays are out working.

Health Visitors.

The part to be played by the health visitor in the health and welfare of the family has been studied by a Working Party set up in 1953 by the Ministries of Health and Education under the chairmanship of Sir Wilson Jameson, former Chief Medical Officer. A report has now been published and deals with the field of work, training and recruitment of health visitors. Evidence was received from a wide range of local government, professional and educational organizations. There is wide support for the conception of a domiciliary team with the family doctor as the clinical leader and the health visitor as a central figure in the team. The importance of her work with mothers and young children, with the school child, and with the tuberculous

[1] From the original in the Mitchell Library, Sydney.

is fully realized; and the Working Party suggests that she should also be associated with schemes for the aged and the handicapped. She should act as a "common factor" in family welfare, a source of information and advice on health, but should not be described as a social worker nor practise as a nurse or midwife.

Ante-Natal Care and Maternal Mortality.

The maternal death rate in childbirth in England and Wales over the last fifty years has been lowered from five to under one per thousand; but there still remains a substantial proportion of the present 500 or so maternal deaths each year which must be regarded as avoidable. The principal cause of maternal death is toxæmia of pregnancy, and the view expressed by the Advisory Committee of the Central Health Services Council is that the time has come for a concerted effort to tackle this problem. Those concerned with the maternity service in this country are the general practitioners, the local health authorities, who administer the ante-natal clinics, and the maternity hospitals. There is need for meetings of professional representatives of the three parts of the maternity service to discuss what can be done to prevent this mainly clinical problem. A thorough overhaul of the ante-natal supervision is needed. The Advisory Committee urge that the pattern of supervision for a mother should be mapped out at the first visit by the family doctor, midwife or hospital staff concerned. There is need for closer collaboration between all those who may be concerned with the care of the individual expectant mother, whether hospital consultants, general practitioners, midwives, or the staffs of ante-natal clinics. Sympathetic understanding and the alleviation of the fears which many mothers have, especially those having their first baby, are stressed.

Causes of Blindness.

A review by Professor Sorsby on blindness in England, 1951-1955, reveals an increase in the number of blind persons; practically the whole of this increase was confined to those over seventy years of age. Other changes are an increase in children from one to five years, but some decrease between the ages of twenty-one to thirty-nine years. Of newly registered blind persons, 38% are now eighty years or over, with a higher proportion of women than of men. It is likely that these results are determined as much by social reasons as by medical conditions. No obvious social influence explains the marked increase in children under five years of age. Three affections—cataract, macular lesions and glaucoma—account for 80% of blindness among those aged over seventy. Between fifty and sixty-nine years the outstanding causes are cataract, glaucoma, myopia and diabetes. Between fifteen and forty-nine years congenital defects, abiotrophic anomalies and myopia account for 50% of all cases. In children of school age (five to fourteen years) 57% showed congenital and developmental abnormalities.

In the last twenty years the virtual elimination of three infective causes of blindness—ophthalmia, syphilis and meningitis—is outstanding. During this period the blind population has increased from 67,000 to 94,000. It is estimated that this figure will be doubled in the next twenty years unless there is a massive and therapeutic advance. More facilities for fundamental ophthalmological research are needed to deal with this problem.

The Care of the Epileptic.

A review of the arrangements for the care of epileptics has been carried out by a special committee with Lord Cohen as chairman. The incidence of epilepsy in this country is estimated to be about four per thousand of the population, and the present position regarding their care is not regarded as satisfactory by the committee. Some patients are having no treatment, while others are taking routine doses of drugs, often prescribed long ago and never reviewed. The main reasons for this state of affairs is summed up as follows: (i) There is insufficient appreciation of modern advances in diagnosis and treatment. (ii) Many patients tend to look upon epileptic fits with indifference or to accept them as inevitable, not realizing that they may be controlled by medical care.

In many parts of the country facilities for diagnosis and treatment are inadequate. Specialist advice is not easily available to general practitioners in difficult cases; although hospital boards were recommended in 1951 to ensure that in every area there was at least one consultant prepared to take an active interest in epilepsy. Where such advice was available, those concerned seemed to be unaware of it.

The general practitioner should take an active interest in the problems of the epileptic and should, in conjunction with hospitals, be responsible for their long-term supervision.

Homes for epileptics or epileptic colonies, some providing facilities for rehabilitation, are at present outside the scope of the National Health Service. Some are administered by voluntary organizations and others by local authorities. It is hoped eventually that admission to these homes will be through the hospital service on the recommendation of a specialist.

B.C.G. Vaccination of School Children.

In 1953 vaccination of school leavers against tuberculosis was recommended to the local health authorities by the Minister of Health. It has now been shown in the first report of the Medical Research Council on Tuberculosis Vaccines that vaccination of children in their teens offers a substantial degree of protection. Since 1953, 106 out of 146 local health authorities have offered vaccination to thirteen-year-old school children. Some authorities have preferred to wait until the results of the above investigation of the success of the vaccine was made known. This investigation by the Medical Research Council applies to children vaccinated between 1950 and 1952 who have been kept under observation since the date of vaccination. Although there is evidence that vaccination offers good protection, it is realized that until there has been a longer follow-up of the children, it will not be possible to assess whether the protection afforded persists through the period of adolescence.

Poliomyelitis Vaccination.

Nearly 2,000,000 children in Great Britain born in the years 1947 to 1954 were registered for vaccination against poliomyelitis. Last May, enough vaccine was issued to vaccinate 200,000 children. Vaccination ended on June 30 owing to the inadvisability of continuing inoculations during the season of greatest prevalence of the disease. Vaccination will be resumed in the autumn.

Correspondence.

STERNAL PUNCTURE: ITS INDICATIONS AND LIMITATIONS.

SIR: May I comment on Dr. Hurt and Dr. Robertson's paper "Sternal Puncture: Its Indications and Limitations" (M. J. AUSTRALIA, July 28)?

Whilst agreeing with most of their statements, I would suggest that inadequate stress has been put on the place of marrow examination in prognosis, and control or choice of therapy.

In the case of megaloccytic anæmias, changes in the marrow in response to effective therapy will precede those in the peripheral blood by four days or more, and can be detected with certainty within twenty-four hours. Most hæmatologists can quote cases where convalescence has been delayed merely because this simple investigation had been omitted. My own experience of preventing a major operation in two cases may perhaps be exceptional.

The marrow picture gives a useful guide to therapy and prognosis in cases of thrombocytopenia whatever their ætiology. Hypoplasia of the megakaryocytic series, particularly in the absence of marked maturation arrest, has a bad prognosis whatever treatment is attempted. The finding of hyperplasia and maturation arrest warrants the use of ACTH in near toxic dosage, and if peripheral blood thrombocytopenia recurs, splenectomy.

Whilst as a general principle children should be subjected to the minimum of painful investigations, a marrow examination is essential in all cases of anæmia which cannot be fully explained by other means before commencing treatment. In young children leuchæmias are easily overlooked in the early stage because of the higher normal proportion of mononuclear cells in peripheral blood, and higher incidence of the aleuchæmic phase of the disease. The type of leuchæmia can therefore be determined only from a marrow examination in a large proportion of cases, and has some bearing on prognosis and treatment.

I would like to draw attention to the advantages of the vertebral spinous process as a marrow source, over the sternum. It is more reliable particularly in patients over the age of forty. Because of the poorer nerve supply to the

lumbar region, the absence of the subjective reaction to pressure on the chest, and (not the least reason) because the area is out of sight, it causes less concern to the patient. (Patients who had experienced both procedures have left me in no doubt as to their preference.) In common with other colleagues who have given both methods a fair trial, I have therefore adopted the lumbar spine puncture as a routine in all adults unless there is a special indication for choosing another site, such as X-ray evidence of a localized lesion.

The value of total nucleated cell counts on marrow aspirates should also be reviewed. It is deprecated by many authorities because of the allegedly wide range of normality. I find, however, that this range is considerably reduced in the hands of any one operator using a standard technique, although it will vary from one operator to another. In my hands the normal range of nucleated cells is 18,000 to 25,000 per cubic millimetre. A definite figure, rather than the statement of an impression, is of greater use in the assessment of marrow activity in serial examinations. Its accuracy must not be over-rated, but with that proviso, the total nucleated cell count can be of help in the differential diagnosis of a difficult marrow picture.

Yours, etc.,

A. KERTESZ,
Pathologist.

Pathology Department,
Base Hospital,
Hamilton,
Victoria.
August 9, 1956.

THE WORLD POPULATION PROBLEM.

SIR: Your timely leading article on "The World Population Problem" (August 11, 1956) contained this surprising statement: "One cannot imagine that the millions of people in India, China and Indonesia, to name only three countries, could ever be brought to think seriously about voluntary parenthood and adopt it."

As a matter of fact the people of India, China, Indonesia and other Asian countries have not only thought seriously about voluntary parenthood, but they have formed birth control societies and family planning associations which are rapidly disseminating information concerning the control of conception. The people generally are eager to acquire knowledge which so intimately affects their welfare. Australia was represented at the Third International Conference on Planned Parenthood, held in Bombay in 1952. The social, economic, medical and political aspects of this most vital question were fully discussed by delegates from Asian countries. I refer you to the published report of the conference.

It seems that there is no need to be timid about ethical or religious objections. Professor Chandrasekhar, Head of the Department of Economics and Director of the Indian Institute for Population Studies at the University of Baroda, wrote in the *International Labour Review*, June, 1954:

> The mere mention of birth control for these underdeveloped areas conjures up all kinds of difficulties—religious, cultural and social. The truth is, however, that countries such as India, Japan, Ceylon and Malaya are more advanced than many countries in the West as far as the public and government reception of this idea is concerned. The alleged religious opposition to the idea, be it from Hinduism, Islam, or Buddhism, is simply not there. . . . It was recently announced in Egypt that the higher Muslim divines had given their approval to birth control, since no contrary injunction can be found in the Koran.

Yours, etc.,

V. H. WALLACE.

61 Collins Street,
Melbourne,
August 16, 1956.

AN INVESTIGATION OF CHILDREN WITH INDOLENT LEG ULCERS.

SIR: The Clinical Research Unit, Royal Prince Alfred Hospital, is carrying out some studies on serum proteins and would be particularly grateful for the opportunity to investigate children with indolent leg ulcers. This is a short-term study and it should not be necessary to see the patient more than once, after which he or she will be referred back to their own doctor with a report of our investigations. An appointment can be arranged by contacting the Secretary of the Clinical Research Unit, telephone LA 0444, extension 572.

Yours, etc.,

C. R. B. BLACKBURN,
Director, Clinical Research Unit.

Royal Prince Alfred Hospital,
Missenden Road,
Camperdown,
New South Wales.
August 16, 1956.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 43, of August 9, 1956.

AUSTRALIAN MILITARY FORCES.

Citizen Military Forces.

Southern Command.

Royal Australian Army Medical Corps (Medical).—3/129385 Captain (provisionally) M. G. Whiteside is seconded whilst in the United Kingdom, 20th June, 1956. F3/1019 Captain (provisionally) P. B. Blackall relinquishes the provisional rank of Captain, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Northern Command), and is granted the honorary rank of Captain, 2nd June, 1956. The provisional appointments of the following officers are terminated: Captains 3/101819 J. H. S. Martin, 1st April, 1956, and 3/129385 M. G. Whiteside, 26th July, 1956. To be Captains (provisionally): 3/101819 James Herbert Stephens Martin, 2nd April, 1956, and 3/129385 Maxwell George Whiteside, 27th July, 1956.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

Southern Command.—To be Honorary Captains: Carmine Antonio Barbaro, 4th June, 1956, and Mathew Christopher Green, 16th June, 1956.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

Allan Douglas Wakeham (015184) is appointed to a short-service commission, on probation for a period of twelve months, 18th June, 1956, with the rank of Flight Lieutenant.

The probationary appointment of Flight Lieutenant E. H. Stephenson (0312182) is confirmed.

The short-service commission of Flight Lieutenant (Acting Squadron Leader) G. S. Radford (025626) is extended to 28th November, 1956.

The resignation of the following officers is accepted: Squadron Leader R. H. B. Sacks (036080), 15th June, 1956; Flight Lieutenants M. W. Williams (024203), 29th June, 1956, and F. J. G. Arnold (025085), 1st July, 1956.

University Intelligence.

THE UNIVERSITY OF ADELAIDE.

The Shorney Prize.

THE Shorney Prize, established for the purpose of perpetuating the memory of the late Herbert Frank Shorney, M.D., F.R.C.S., Lecturer in Ophthalmology in the University of Adelaide from 1926 to 1933, will be offered for the eighth time in 1957, and will be for work in ophthalmology.

The relevant clauses of the Statute are as follows:

3. A post-graduate prize, to be called The Shorney Prize, of the value of £100, shall be awarded to the candidate who in the opinion of the examiners has made the most substantial contribution to knowledge in the subjects of ophthalmology or of diseases of the ear, nose and throat.

4. The recipient must be a graduate of an Australian university.

5. The material submitted for the prize may be either a thesis or published work in medical or scientific literature.

6. Each candidate must declare that the work described is his own.

7. The prize shall be offered for competition from time to time as the accumulations of the fund permit.

8. The prize shall be offered at least twelve months before the last day for the receipt of applications.

9. The prize shall not be awarded on any occasion unless in the opinion of the examiners the material submitted is of sufficient merit.

Applications, accompanied by three copies of the evidence which the candidates wish to submit in support, must reach the Registrar, University of Adelaide, not later than August 31, 1957.

Medical Practice.

NATIONAL HEALTH ACT.

THE following statement appeared in the *Commonwealth of Australia Gazette*, Number 47, of August 16, 1956.

NATIONAL HEALTH ACT, 1953-1956.

Pharmaceutical Benefits.

Amending Determination No. 1 of 1956.

For the purposes of section 85 of the *National Health Act* 1953-1956 and for the purposes of the National Health (Pharmaceutical Benefits) Regulations made under that Act, I, Donald Alastair Cameron, Minister of State for Health, hereby make the following determination:

1. This determination shall come into operation on the first day of August, 1956.

2. The determination made for the purposes of section 85 of the Act and for the purposes of the National Health (Pharmaceutical Benefits) Regulations and published in the *Gazette* on the fifth day of July, 1956, is in this determination referred to as the Principal Determination.

3. Clause 8 of the Principal Determination is amended by inserting in paragraph (*b*), after the words "the Director-General", the words, "the Director or the Commonwealth Director of Pharmaceutical Services".

4. An item of the First Schedule to the Principal Determination specified by number in the first column of the First Schedule to this determination, being an item corresponding in number to the item number of a general pharmaceutical benefit in the First Schedule to the National Health (Pharmaceutical Benefits) Regulations, is amended as set out in the second column of that Schedule opposite to that number.

5. An item of the Second Schedule to the Principal Determination specified by number in the first column of the Second Schedule to this determination, being an item corresponding in number to the item number of a general pharmaceutical benefit in the Second Schedule to the National Health (Pharmaceutical Benefits) Regulations, is amended as set out in the second column of that Schedule opposite to that number.

The following notice appeared in the *Commonwealth of Australia Gazette*, Number 42, of August 2, 1956.

NATIONAL HEALTH ACT, 1953-1956.

Part VII: Pharmaceutical Benefits.

Suspension of Medical Practitioner.

I, Donald Alastair Cameron, the Minister of State for Health, in pursuance of section 134A of the *National Health Act*, 1953-1956, hereby give notice that, following investigation and report by the Medical Services Committee of Inquiry for the State of New South Wales, in pursuance of the powers conferred by sub-section (1.) of section 95 of the said Act I have suspended, for a period of twelve months, commencing on the 26th July, 1956, the authority of Frank William Fowler, 401 Belmore-road, Herne Bay, medical practitioner, under section 88 of the said Act to write a prescription for the supply of pharmaceutical benefits and

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED AUGUST 18, 1956.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	7(5)	1(1)	..	..	..	..	..	9
Amœbiasis	..	..	..	..	2(2)	..	..	..	2
Ancylostomiasis	..	..	27	..	..	..	..	..	27
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	1	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	2	7(6)	3(2)	..	..	..	..	..	12
Diphtheria	1(1)	1(1)	1	..	3(3)	..	..	..	6
Dysentery (Bacillary)	..	2(1)	..	1(1)	1	..	4	..	8
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	1	..	..	1
Infective Hepatitis	64(26)	60(16)	..	13(2)	..	13	1	7	158
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	4	..	..	..	4
Leptospirosis	..	..	3(1)	..	..	..	..	..	3
Malaria	..	..	3(3)	..	..	..	..	..	3
Meningococcal Infection	4(2)	4(2)	3(1)	..	1(1)	..	..	..	12
Ophthalmia	..	..	..	..	1(1)	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	4(3)	..	..	..	4(1)	..	..	8
Puerperal Fever	..	..	1	..	..	..	1	..	2
Rubella	..	18(12)	..	6(6)	1(1)	..	..	..	25
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	13(10)	12(7)	9(3)	5(2)	2(2)	..	..	..	41
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	3(1)	..	5	..	8
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	28(20)	16(8)	18(15)	4(3)	11(9)	5(1)	1	2	85
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	1(1)	..	..	..	1
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

under section 93 of the said Act to supply pharmaceutical benefits, for the reason that I am satisfied that the said medical practitioner has been guilty of conduct which was a contravention of the National Health (Pharmaceutical Benefits) Regulations.

Dated this 24th day of July, 1956.

DONALD A. CAMERON,
Minister of State for Health.

Notice.

CLINICO-PATHOLOGICAL CONFERENCE AT SYDNEY HOSPITAL.

WE have been asked to announce a change in the date of the September clinico-pathological conference at Sydney Hospital. This conference will be held in the Maitland Lecture Theatre on the second Tuesday of the month, September 11, instead of the third Tuesday. The reason for the change is to make the conference coincide with "Back to Sydney Hospital Week".

Medical Prizes.

AMERICAN COLLEGE OF CHEST PHYSICIANS.

Prize Essay Contest, 1957.

THE Council on Undergraduate Medical Education of the American College of Chest Physicians offers three cash awards to be given annually for the best contributions prepared by undergraduate medical students on any phase in the diagnosis and treatment of chest diseases (heart and/or lungs).

Upon the recommendation of the Council, which was approved by the Board of Regents of the College at their recent annual meeting, the awards will be increased for the 1957 contest. The first prize will be $500, the second prize $300, and the third prize $200. Each winner will also receive a certificate of merit.

The winning contributions will be selected by a committee of chest specialists and will be announced at the 23rd Annual Meeting of the American College of Chest Physicians, to be held in New York City from May 29 to June 2, 1957. All manuscripts become the property of the American College of Chest Physicians.

Applicants are requested to study the format of *Diseases of the Chest*, the official journal of the College, as to length, form, and arrangement of illustrations, to guide them in the preparation of the essay. A copy of the College journal will be sent upon request. The following conditions must be observed: (i) An application form must be completed; this may be obtained by writing to the Executive Director, American College of Chest Physicians, 112 East Chestnut Street, Chicago II, Illinois, United States of America. (ii) Five copies of the manuscript typewritten in English (double spaced) should be submitted to the College offices in Chicago not later than April 10, 1957. (iii) The only means of identification of the author shall be a motto or other device on the title page, and a sealed envelope bearing the same motto on the outside, enclosing the name and address of the author.

ALVARENGA PRIZE, 1956.

ON July 14, 1956, the College of Physicians of Philadelphia awarded the Alvarenga Prize for 1956 to George N. Papanicoloau, M.D., Director of the Papanicoloau Research Laboratory of Cornell University Medical College, for his outstanding work in the early detection of cancer. The Alvarenga Prize was established by the will of Pedro Francisco DaCosta Alvarenga, of Lisbon, Portugal, an Associate Fellow of the College of Physicians of Philadelphia, to be awarded annually by the College of Physicians on the anniversary of the death of the testator, July 14, 1883.

Congresses.

INTERNATIONAL CONGRESS ON RHEUMATIC DISEASES.

THE ninth International Congress on Rheumatic Diseases will be held at Toronto, Ontario, Canada, from June 23 to 28, 1957. This quadrennial function of *La Ligue internationale contre le rhumatisme* will be held under the auspices of the Canadian Rheumatism Association. The Programme Committee invites contributions to the scientific programme of the Congress, and is anxious to receive reports on current clinical or basic research dealing with any aspect of the rheumatic diseases. Those offering papers for consideration should submit a 200 to 300 word abstract not later than January 1, 1957. Abstracts should be submitted in triplicate in the language in which the paper is to be read. If an abstract is submitted in a language other than English, it will be helpful, though not essential, if it can be accompanied by an English translation. All correspondence should be directed to the Ninth International Congress on Rheumatic Diseases, Post Office Box 237, Terminal "A", Toronto, Ontario, Canada.

Diary for the Month.

SEPT. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 14.—Tasmanian Branch, B.M.A.: Branch Council.
SEPT. 14.—Queensland Branch, B.M.A.: Council Meeting.
SEPT. 17.—Victorian Branch, B.M.A.: Finance Subcommittee.
SEPT. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 19.—Western Australian Branch, B.M.A: General Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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